

**MILLI-Q PLUS
OPERATING
AND
MAINTENANCE
MANUAL**

990

MILLIPORE

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READ THIS BEFORE STARTING!!

Send back the information card

To register your system and become eligible for discounts, special promotions and a free subscription to *Millipore News*, you must send back the information card that came in this package.

Avoid leakage at connectors

To avoid leaks, push tubing in firmly; then pull back on the tubing once or twice to make sure it is securely seated.

Maintain sufficient water supply

Make sure that adequate feed water exists to supply the system during operation.

Danger: high voltage

Unplug the system before replacing the fuse.

Work on PC board at own risk

Working on the PC board will void the system's warranty. Call Millipore Technical Service if you encounter problems with the PC board.

Wet the O-Rings

Wet the O-rings on the QPAK before (*all systems*) inserting the pak into the system. Failure to wet the O-rings will damage them and can cause leaks.

■ HOW TO USE THIS MANUAL

This manual describes the new, compact Milli-Q Plus water purification system.

Chapter 1 *Introduction* — introduces you to the Milli-Q Plus water purification system and its components.

Chapter 2 *Installation* — describes how to install the Milli-Q Plus system in your laboratory.

Chapter 3 *Operation* — describes how to take water from the Milli-Q Plus system.

Chapter 4 *Maintenance* — describes how to care for your Milli-Q Plus system, including how to change the QPAK™ purification pack, Millipak™ 40 final filter, and fuse.

Chapter 5 *Troubleshooting The Milli-Q Plus System* — describes how to diagnose and solve problems with your Milli-Q Plus system.

Chapter 6 *Technical Information* — includes technical service information, ordering information, system specifications, and the Millipore warranty.

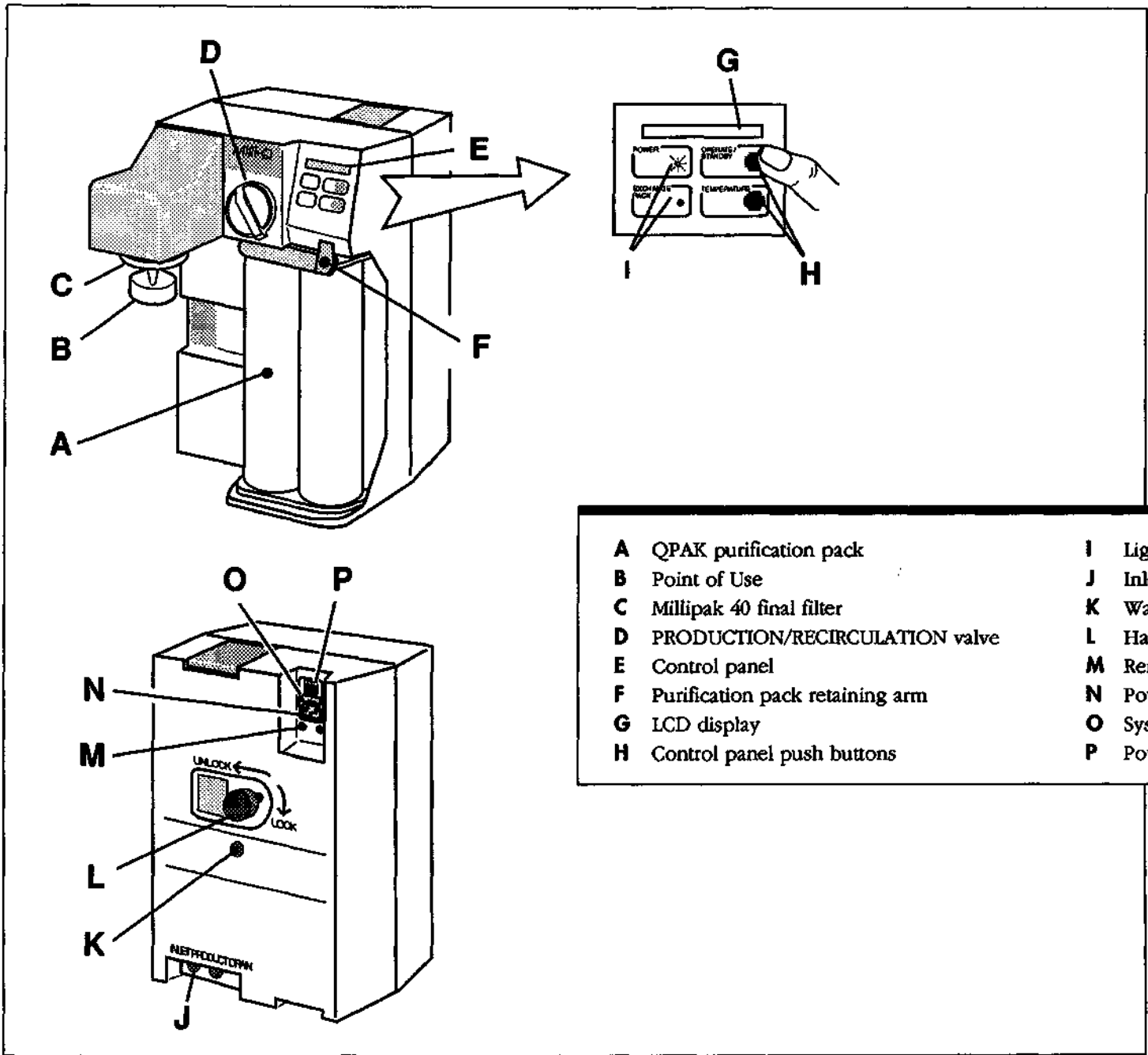
Appendix 1 *Advanced Maintenance and Troubleshooting Functions* — describes how to adjust and troubleshoot the Milli-Q Plus system PC board.

Appendix 2 *Remote Control of The Milli-Q Plus System* — describes how to operate the system from a remote unit.

Note: Illustrations are present throughout this manual to help you understand how to perform the procedures described. In the upper-right corner of each illustration, the display is shown. By comparing this against the display reading on your system, you can double check that you have the system in the correct mode.

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1 INTRODUCTION

Congratulations — you now own the latest technology in water purification! Your new, compact Milli-Q Plus water purification system provides up to 1.5 liters/minute (L/min) of ultrapure water on demand for the most critical analytical and biotechnological applications.

This state-of-the-art system is designed to provide the final polish to water pretreated by reverse osmosis (RO), distillation, or deionization (DI). The new, compact Milli-Q Plus system produces Type I, reagent-grade water that meets or exceeds all ASTM, CAP, ACS, and NCCLS standards for purity*:

Water Quality	Specification
Resistivity	18 megohm-cm
Total Organic Carbon (TOC)	≤ 10 ppb
Particle-free	≥ .22 µm
Total Dissolved Solids	< 20 ppb
Silicates	< .1 ppb
Heavy metals	≤ 1 ppb
Microorganisms	≤ 1 cfu/mL

*ASTM: American Society for Testing and Materials
CAP: College of American Pathologists
ACS: American Chemical Society
NCCLS: National Committee for Clinical Laboratory Standards

Milli-Q Plus System Features

The Milli-Q Plus system has been carefully designed to ensure consistently high water quality:

- The patented **QPAK purification pack** virtually eliminates dead-water volume, significantly reducing contamination.
- The **Millipak 40 point-of-use filter** provides a final, .22 µm filtration just before water is delivered to your point of use.
- **Automatic recirculation** of water in the system every hour discourages bacterial growth and maintains water quality between uses.
- A **resistivity sensor** automatically tests the resistivity, or purity, of the water in the system; the reading is automatically temperature compensated to 25°C (77°F).
- The system **standby mode** allows automatic intermittent recirculation without continuously running the pump; this prevents excessive wearing of the pump.

The compact design enables you to install the Milli-Q Plus system on your laboratory bench or mount it on a wall. This versatile system can also be automatically controlled from a remote location such as a clinical analyzer.

The QPAK purification pack contains all of the purification media needed to achieve high-quality water: activated carbon to remove dissolved organics, nuclear-grade ion exchange

resins to “polish” out inorganic ions to 18 megohm-cm resistivity, and the Organex-Q™ organic scavenger mixture to remove trace organics to 10 parts per billion (ppb). Because DI water typically contains higher levels of particulate/colloidal matter, microorganisms, and organics, than distilled or RO water, the QPAK purification pack for DI feed water contains an initial .5 micron (µm) prefilter to protect the other purification media. The purification pack for RO and distilled feed water contains extra ion exchange resin instead of the prefilter; this extra resin increases the lifetime of the pack.

The QPAK purification pack can be installed quickly and easily without tools, making the system easy to maintain. There are no bowls to clean or multiple cartridges to store. A control panel light indicates when the pack is recommended to be changed for optimum water quality. The superior system design and materials of construction eliminate extractables.

The alphanumeric display makes the Milli-Q Plus system simple to use: it allows you to easily monitor the status of the system at all times. In case of power failure, the system’s battery “remembers” the current function — when power is restored, the unit will restart in the correct mode. Upon request, the contrast of the display can be adjusted.

How The Milli-Q Plus System Works

The new, compact Milli-Q Plus system is controlled by a micro-processor (PC board) located inside the system’s cabinet. It is electronically connected to the alphanumeric display, which shows you:

- water quality (resistivity)
- Auto Test results
- system mode (for STANDBY and RECIRCULATION)
- temperature
- system errors

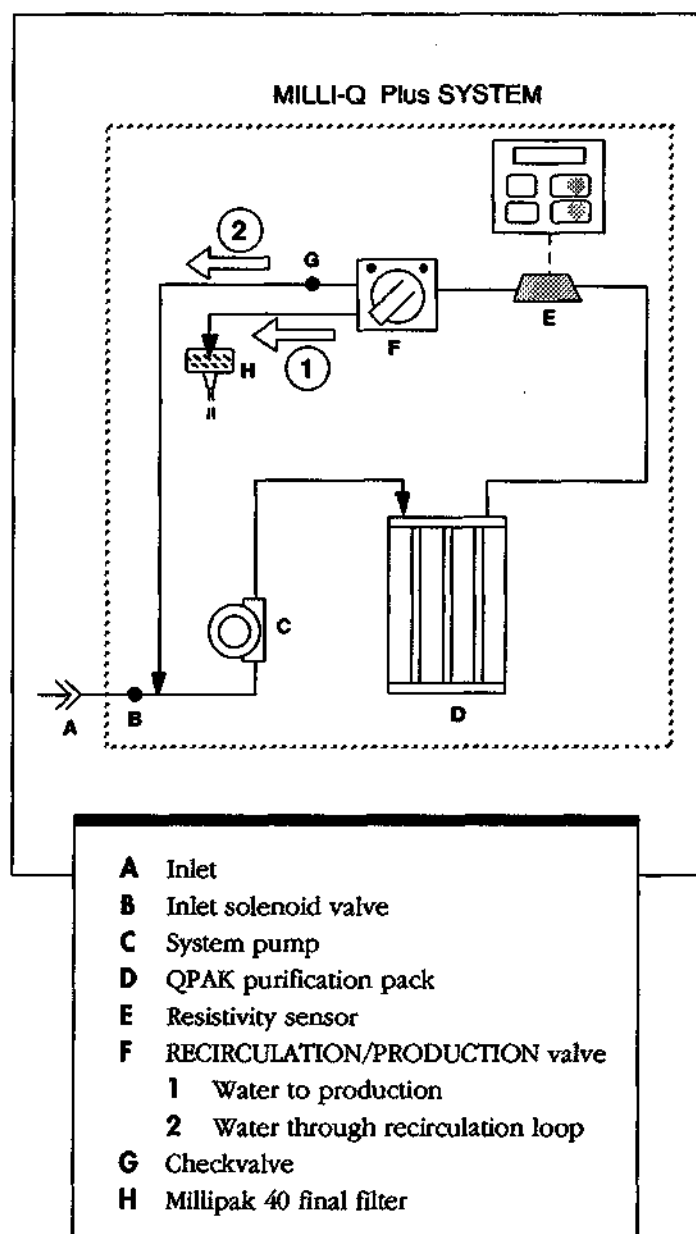
Water flows into the Milli-Q Plus system through an inlet solenoid valve, then through the system pump and into the QPAK purification pack. The resistivity sensor measures the water quality before the purified water flows through the RECIRCULATION/PRODUCTION valve and into a check valve. Water then flows either through a Millipak 40 final filter at the point of use or it is recirculated through the system.

The Milli-Q Plus system contains many built-in features that allow you to easily control and monitor the system’s functions:

■ OPERATE/STANDBY

When the system is in STANDBY, the Milli-Q Plus system automatically recirculates water every 55 minutes for a 5-minute period. During recirculation, the display reads **RECIRCULATION**. Upon request, recirculation frequency can be changed to every 3 hours.

Each time you switch the Milli-Q Plus system from STANDBY to OPERATE, the system runs through an “Auto Test” sequence to test the resistivity sensing system. Test resistivity is displayed for four seconds, followed by the actual resistivity of the water in the system.



In the **OPERATE** mode, the resistivity sensor continuously measures water quality. The set point for minimum water quality is preset at 14 megohm-cm (the resistivity of pure water is 18.2 megohm-cm). If the actual water quality is less than 14 megohm-cm, the resistivity value flashes. Upon request, the resistivity set point can be changed.

■ RECIRCULATION/PRODUCTION

When the system is on, feed water is pumped through the QPAK purification pack and monitored by the resistivity sensor. The **RECIRCULATION/PRODUCTION** valve enables you to control the destination of this purified water. During **PRODUCTION**, purified water is pumped through a final filter and delivered to your point of use at a rate of up to 1.5 liters/minute. During **RECIRCULATION**, water is simply recirculated through the system.

■ TEMPERATURE

In the **STANDBY** mode, pressing the **TEMPERATURE** button will cause the calibration temperature (25°C) to be displayed. In the **OPERATE** mode, the current temperature of the water in the system will be displayed.

■ REMOTE STANDBY

The **REMOTE STANDBY** option enables you to control the operation of the Milli-Q Plus system from a remote location. The display will show **REMOTE STANDBY** until water is needed (as in regular standby, water automatically recirculates for 5 minutes every 55 minutes). When the remote unit needs Milli-Q Plus system water, the system automatically switches to **OPERATE**.

2 INSTALLATION

Preinstallation Requirements

Before you install your new Milli-Q Plus system, your electrical and feed water systems must meet the following requirements.

ELECTRICAL

- grounded electrical outlet within 2.5 meters (m) (8.2 feet [ft]) of the system
- .8 amp for the 115 V/60 Hz system
- .4 amp for the 220 V/50 Hz system
- 1 amp Slo-Blo™ fuse for the 115 V/60 Hz system (provided with the system)
- .5 amp Slo-Blo fuse for the 220 V/50 Hz system (provided with the system)

FEED WATER

For best results, Millipore recommends using RO feed water. However, the Milli-Q Plus system will produce ultrapure, reagent-grade water from DI, RO, or distilled feed water.

For the Milli-Q Plus system to function properly, feed water must meet the following pressure and temperature specifications:

Maximum feed pressure: 15 psi (1 bar)

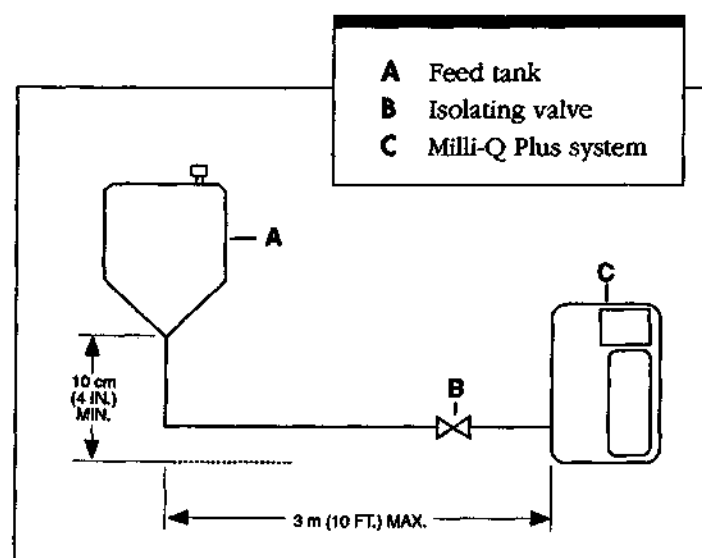
Minimum feed pressure: .5 psi (.03 bar)

Feed water temperature: 5°C - 40°C (41°F - 104°F)

To ensure adequate feed pressure, your Milli-Q Plus system must be installed:

- within 3 m (9.8 ft) of your feed water system
- at least 10 centimeters (cm) (4 inches [in]) below the feed tank if the system is fed from an RO or DI storage tank

If your feed pressure exceeds 15 psi (1 bar), you should install a pressure regulator on the inlet line to the Milli-Q Plus system. Also, a low pressure switch can be connected to the jack (the one on the right, just below the power switch) to prevent the Milli-Q plus system from running if feed pressure is inadequate. The pressure regulator is available from Millipore; see pages 35 and 36 for ordering information.



Millipore also recommends that you install an isolating valve on the inlet water line so that you can easily shut off the water supply to the system. You may already have an isolating valve connected to your feed tank. If not, the isolating valve is available as an accessory from Millipore; see pages 35 and 36 for ordering information.

Note: If your feed tank is from Millipore, you can connect the tubing to the 8 millimeter (mm) quick-connect fitting on the tank. If your feed source terminates with a 1/2" female threaded fitting, you must first connect the 1/2" male - 1/4" female reducing bushing to the fitting, then connect the 1/4" male - 8 mm tubing quick-connect fitting to the reducing bushing. You can then connect the feed tubing to this quick-connect fitting.

Setting Up Your New Milli-Q Plus System

The Milli-Q Plus system is compact and can be easily installed on your laboratory bench. By screwing the feet in or out, the system can be adjusted to accommodate an uneven work surface. The Milli-Q Plus System can also be wall mounted. If you wish to wall mount the unit, you will need to order the optional bracket from Millipore; see pages 35 and 36 for ordering information.

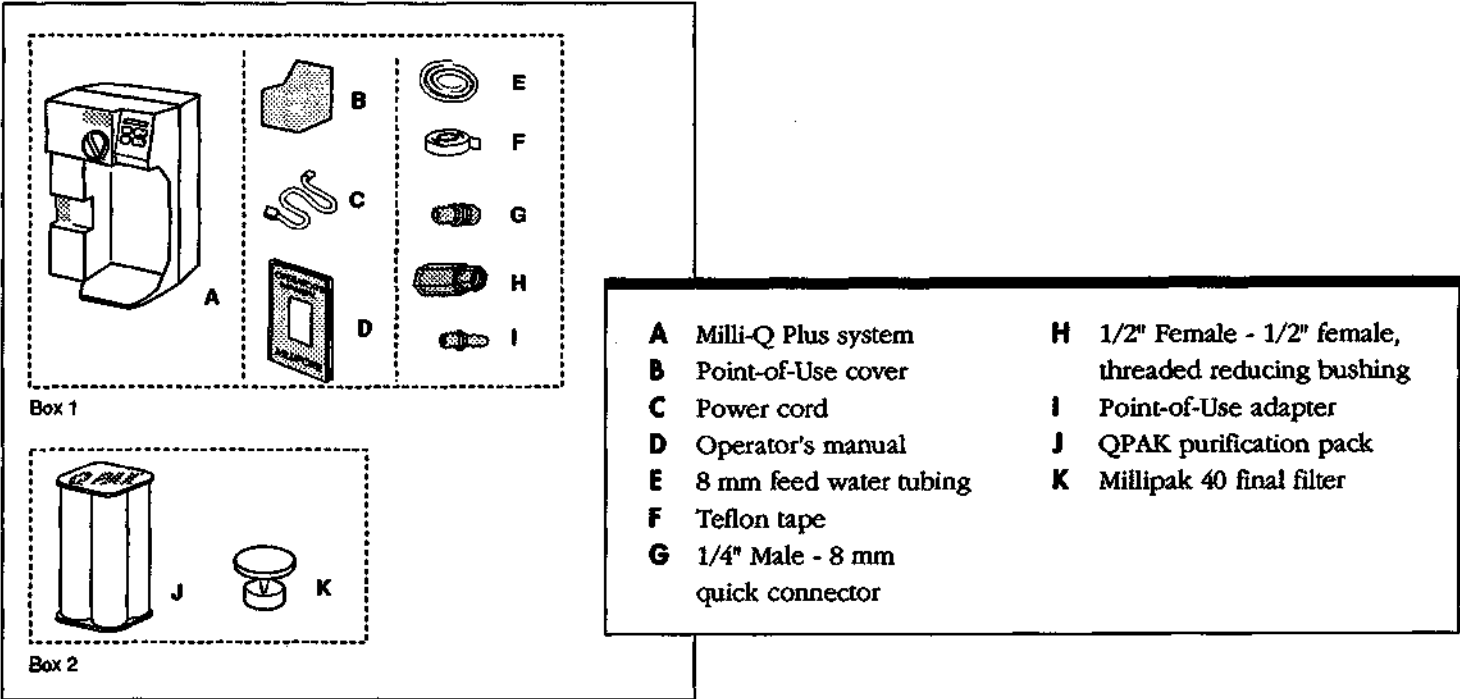
1. Place the following components on the bench where you will locate the system.

From the first box:

- A. Milli-Q Plus system
- B. point-of-use cover for Millipak 40 final filter
- C. power cord
- D. operator's manual
- E. 5 m (16.4 ft) of feed water tubing, 8 mm O.D.
- F. roll of Teflon™ tape
- G. 1/4" male - 8 mm diameter tubing quick-connector
- H. 1/2" female - 1/4" female, threaded reducing bushing, with built-in stainless steel filter
- I. point-of-use adapter (1/4" male - 1/4" hose barb)

From the Starter Kit (second box):

- J. QPAK purification pack
- K. .22 µm Millipak 40 final filter



Note: To register your Milli-Q Plus system and become eligible for discounts, special promotions, and a free subscription to *Millipore News*, you must return the information card that came with your Milli-Q Plus system.

2. The QPAK purification pack you use will depend on your feed water quality. Make sure you have the correct pack from the table below:

Pretreatment	Starter Kit	Catalogue Number
Reverse Osmosis (RO)	QPAK ₁ + Millipak 40 filter	CPMQ K05 R1
Distillation	QPAK ₁ + Millipak 40 filter	CPMQ K05 R1
Deionization (DI)	QPAK ₂ + Millipak 40 filter	CPMQ K05 D2

3. Set up your Milli-Q Plus system on the laboratory bench.
4. Plug the power cord into the Milli-Q UF Plus system and into a grounded, electrical outlet.
5. Turn on the Milli-Q Plus system by pressing the power switch at the top of the system. If the display shows **BATTERY**, the system is not completely charged. Turn off the system for 3 seconds, then turn on the system again. When the system is operating, the battery will recharge. The battery will last 1000 hours if the power is off.

■ CUT AND CONNECT FEED WATER TUBING

CAUTION: The Milli-Q Plus system pump is “self-priming”—it automatically draws water into itself when it starts. Never start the pump unless you have an adequate water supply to feed the system. (The pump starts when you plug in the power cord and turn on the power switch.)

1. If you have installed an isolating valve, make sure it is closed.
2. Remove the protective plastic caps from the ends of the 8 mm feed water tubing.
3. Cut the feed water tubing to reach your water source. To ensure that adequate pressure is attained, make sure feed water tubing is no longer than 3 m (9.8 ft).

Note: The remainder of this tubing will be used at the point of use to clear trapped air.

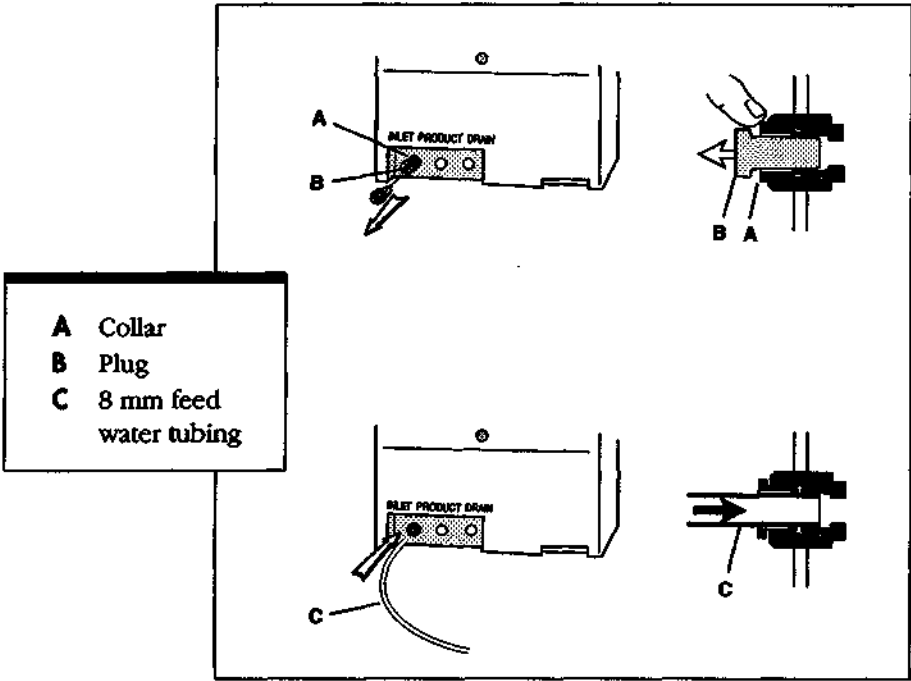
4. Remove the plug which seals the quick-connect inlet port by pressing on the collar. The inlet port is labeled on the lower portion of the rear cabinet.

Note: If you need to disconnect the tubing from the inlet port, simply press the collar and remove.

5. Insert one end of the feed water tubing into the inlet port on the Milli-Q Plus system.

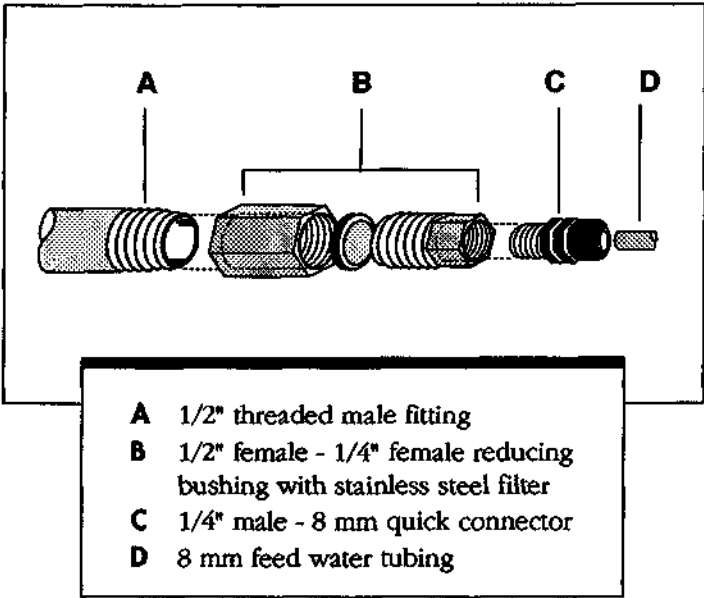
CAUTION: To avoid leaks, push the tubing in firmly, then pull back on the tubing once or twice to make sure it is firmly seated. Once a tube is firmly secured, avoid removing and reinstalling it frequently.

6. Insert and connect the other end of tubing to your feed water supply.



Note: If your feed tank is from Millipore, you can connect the tubing to the 8 mm quick-connect fitting on the tank. If your feed source (for example, a DI line) terminates with a 1/2 " male threaded fitting, you must first connect the 1/2 " female - 1/4 " female reducing bushing to the fitting; then connect the 1/4 " male - 8 mm tubing quick-connect fitting to the reducing bushing. You can then connect the feed water tubing to this quick-connect fitting.

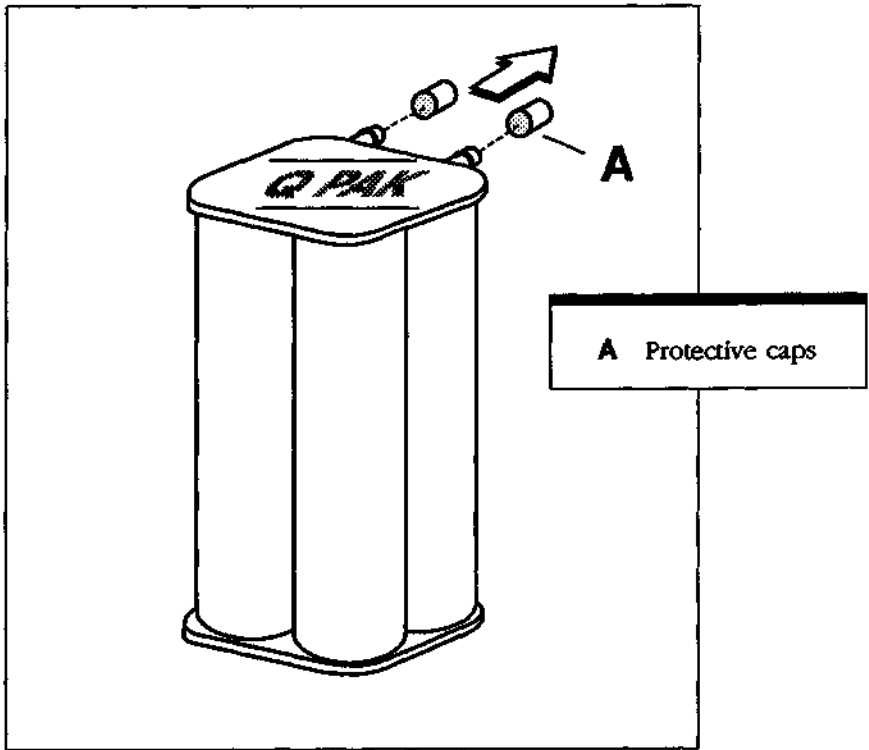
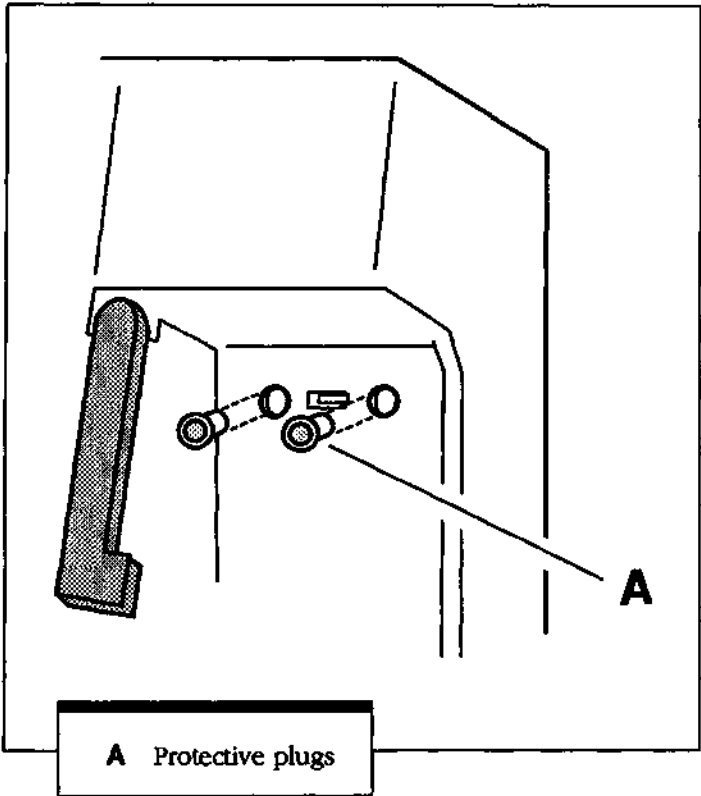
CAUTION: Whenever you use a reducing bushing, wrap the thread two or three times with Teflon tape to seal the connection. This is particularly important if you are making a connection to a metal fitting.



■ **INSTALL THE QPAK PURIFICATION PACK**

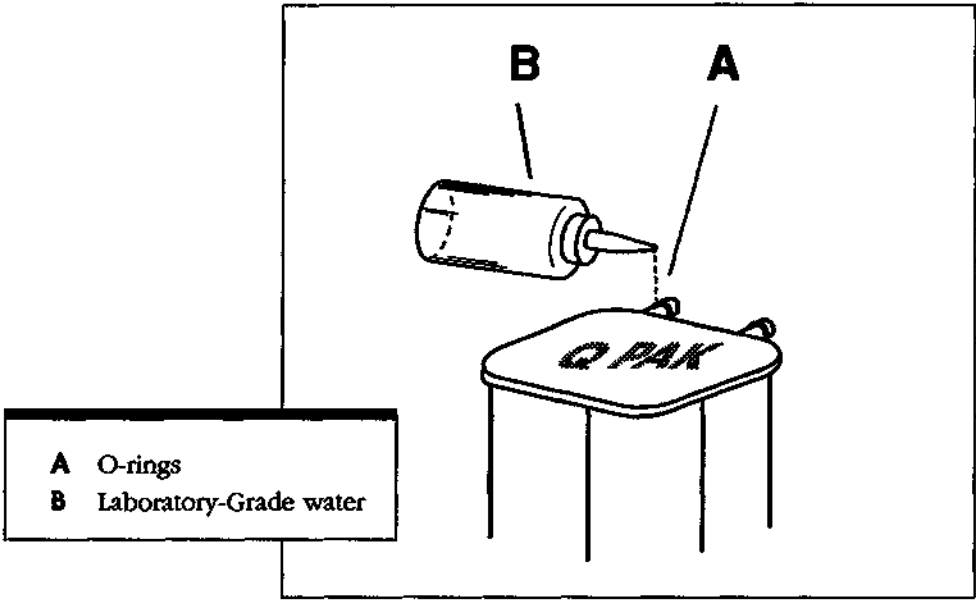
1. Turn off the power by pressing the power switch.

2. Remove the protective plugs from the two pack receiving ports on the Milli-Q Plus system.
3. Remove the two protective caps from the QPAK purification pack.

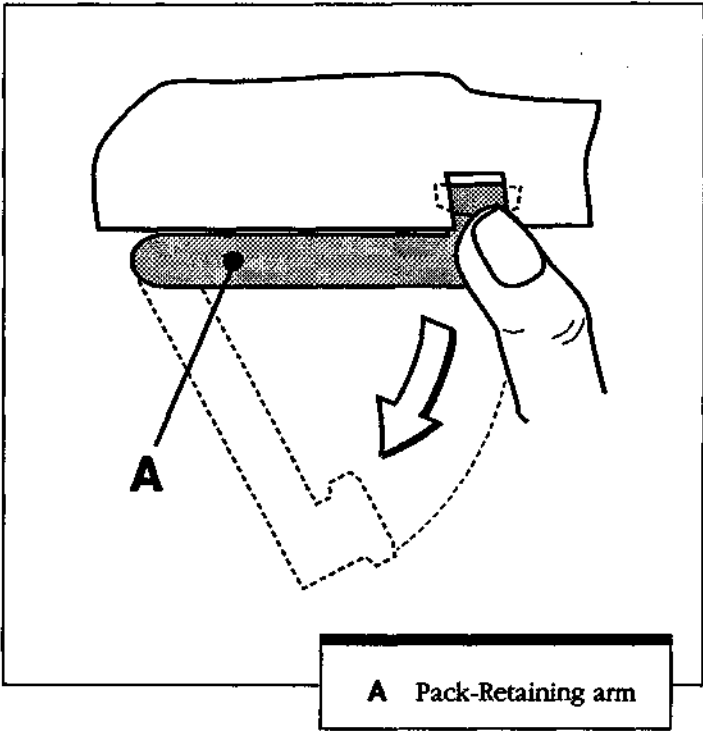


4. Moisten the O-rings on the QPAK purification pack with clean (laboratory- or reagent-grade) water. Failure to moisten the O-rings may cause leaks.

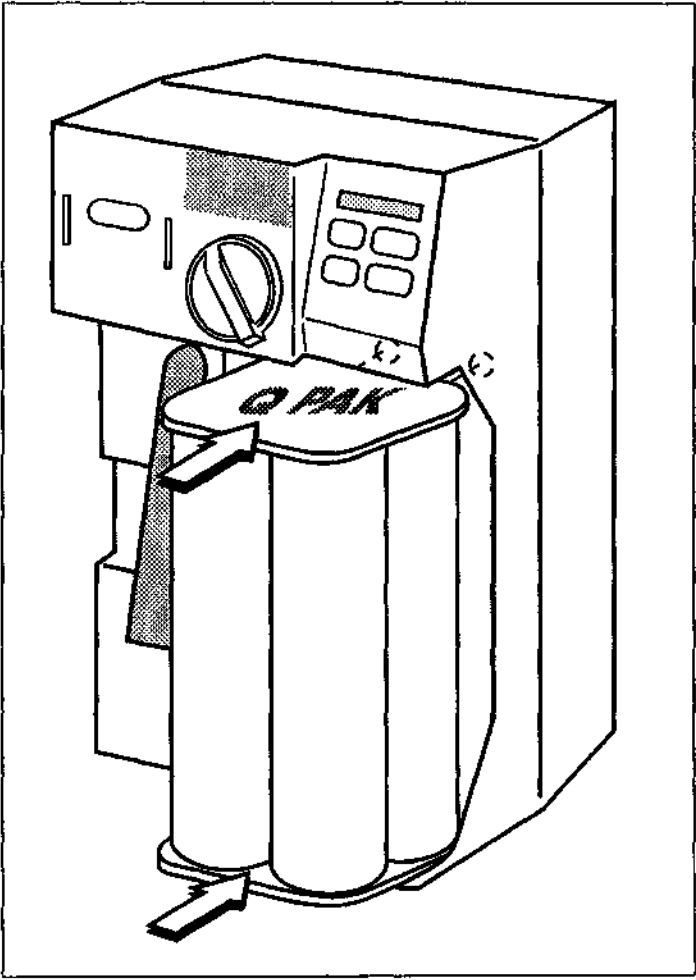
5. Unlock the pack retaining arm by pressing down on the arm and swinging it to the left.



CAUTION: Never use grease to moisten the O-rings on the QPAK purification pack. Grease can contaminate Milli-Q Plus system water.



6. The label on the top of the QPAK purification pack indicates how to orient the pack as you insert it into the system. Hold the Milli-Q Plus system with one hand while you guide the pack into place with your other hand. You will feel the QPAK purification pack seat itself when it is in place.

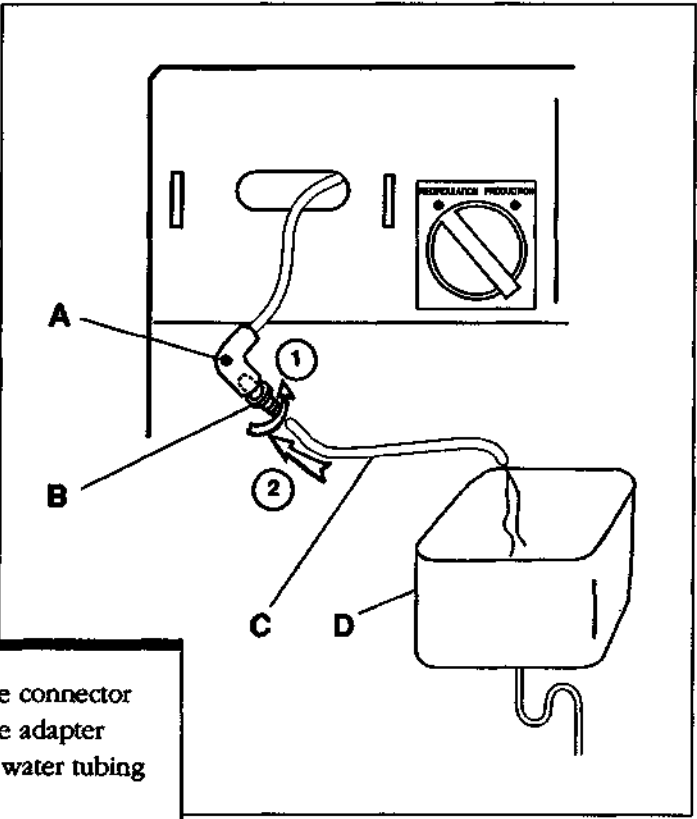


7. Close the retaining arm by swinging it back into place until it clicks.

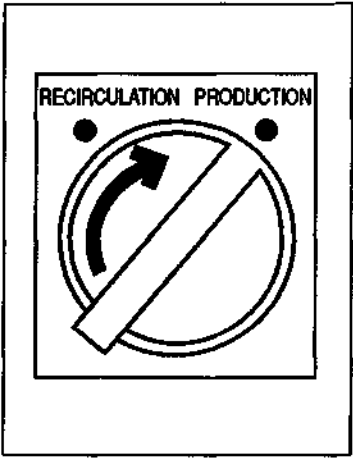
CAUTION: The pack receiving microswitch monitors the status of the QPAK purification pack. If the amber EXCHANGE PACK lamp is lit continuously, the pack might be loose: make sure the purification pack is securely in place and the pack retaining arm is locked.

■ CLEAR TRAPPED AIR

1. Screw the point-of-use adapter (the 1/4 " hose barb) into the point-of-use connector on the system.
2. Attach the remainder of the 8 mm feed water tubing to the adapter. Put the other end of the tubing to the drain.



3. If you installed an isolating valve, open it.
4. Turn the RECIRCULATION/PRODUCTION valve to PRODUCTION.



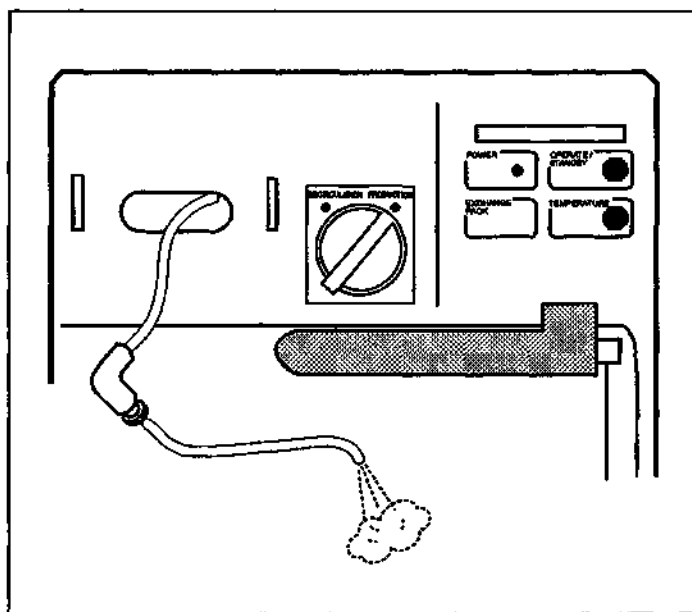
5. Turn on the power. The display will read **RECIRCULATION** for 5 minutes, then **STANDBY**.

Note: Each time the power is turned on, water will recirculate for 5 minutes and the system will automatically go into the **STANDBY** mode. If you press **OPERATE/STANDBY** during these 5 minutes, the system will automatically go into the **OPERATE** mode upon completing the recirculation cycle. If you press **OPERATE/STANDBY** *twice*, the system will go into the **STANDBY** mode.

6. Press **OPERATE/STANDBY** to put the system into the **OPERATE** mode and to start the pump.

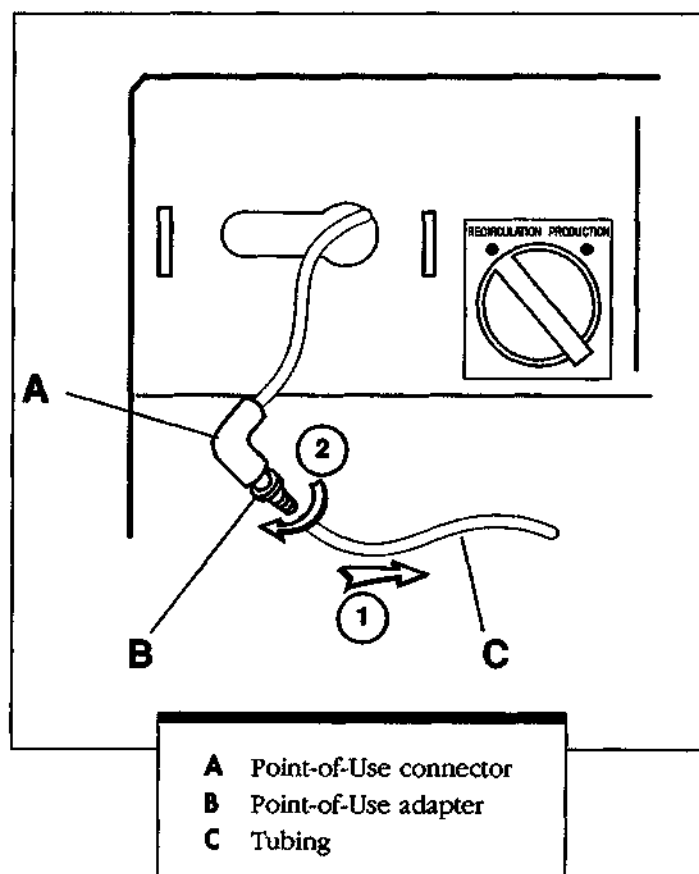
Note: Each time the pump is started in the **OPERATE** mode, the Milli-Q Plus system will automatically run through the Auto Test sequence to ensure proper water quality. The display will initially read **TEST: 15 M Ω cm** (± 1 megohm-cm). After 4 seconds, the display will show the actual resistivity of the water in the system (**PRODUCT: ___ M Ω cm**, up to 18.2 megohm-cm). This value may flash on and off if the actual resistivity in the system is below 14 megohm-cm (the set point). Once the actual resistivity builds to greater than 14 megohm-cm, the display will be steady.

7. Allow the system to purge water and air through the point of use until any trapped air is removed. Then allow the system to run to drain for 5 minutes. As you purge the system, carefully observe each of the tubing connections for leaks.



CAUTION: If water leaks from a tubing connection, perform steps 8 and 9 below; then remove the tubing and reconnect it. Make sure the tubing is secure. Repeat steps 6 and 7 to continue purging the system. Make sure the tubing connections do not leak.

8. Turn the RECIRCULATION/PRODUCTION valve to RECIRCULATION.
9. Press OPERATE/STANDBY to put the system into the STANDBY mode. The display will read **STANDBY**.
10. Remove the tubing and adapter from the point of use.



11. Allow the system to stand undisturbed overnight in STANDBY. This allows the QPAK purification pack to hydrate.
12. In the morning, open the point of use.
13. Press OPERATE/STANDBY to put the Mill-Q Plus system into the OPERATE mode. Allow water to flow to drain for 5 minutes.
14. Close point-of-use-valve. Press OPERATE/STANDBY to put the system into the STANDBY mode.

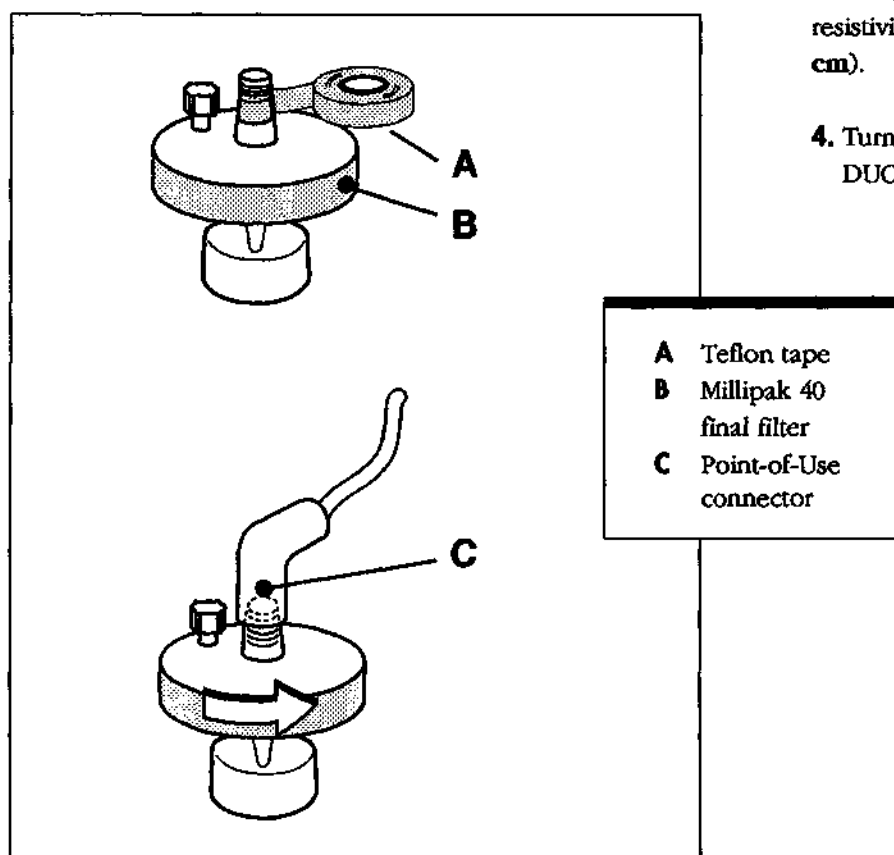
■ INSTALL THE MILLIPAK 40 FINAL FILTER

1. Wrap the thread on the Millipak 40 final filter two or three times with Teflon tape to seal the thread.
2. Screw the Millipak 40 final filter into the connector on the Milli-Q Plus system. Make sure the vent is towards the system.

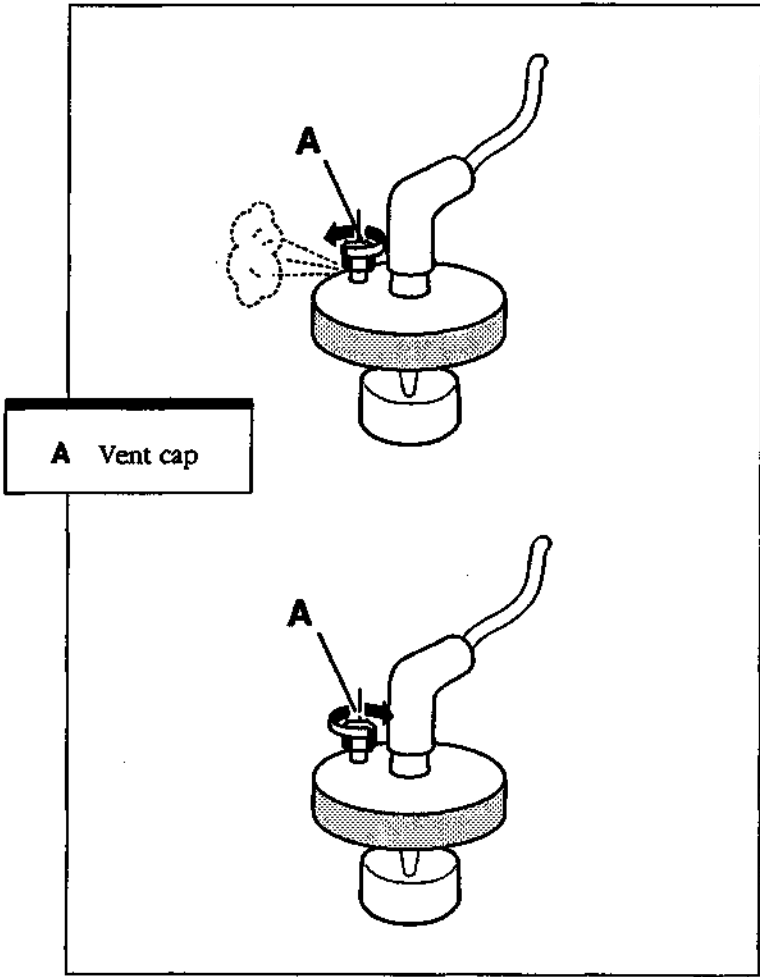
3. Press OPERATE/STANDBY to put the system into the OPERATE mode and to start the pump. (If you installed an isolating valve, make sure it is open.)

Note: As before, the system will automatically run through the Auto Test sequence; the display will read **TEST: 15 M Ω cm** (± 1 megohm-cm), and then will show the actual resistivity of the water in the system (**PRODUCT: ____ M Ω cm**).

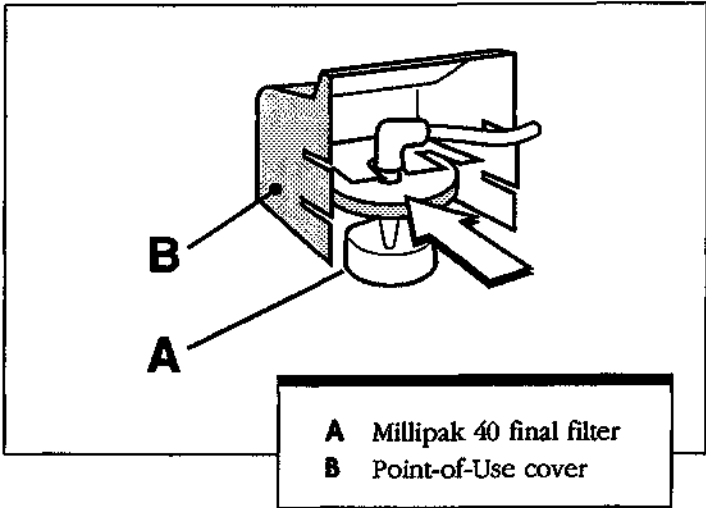
4. Turn the RECIRCULATION/PRODUCTION valve to PRODUCTION.



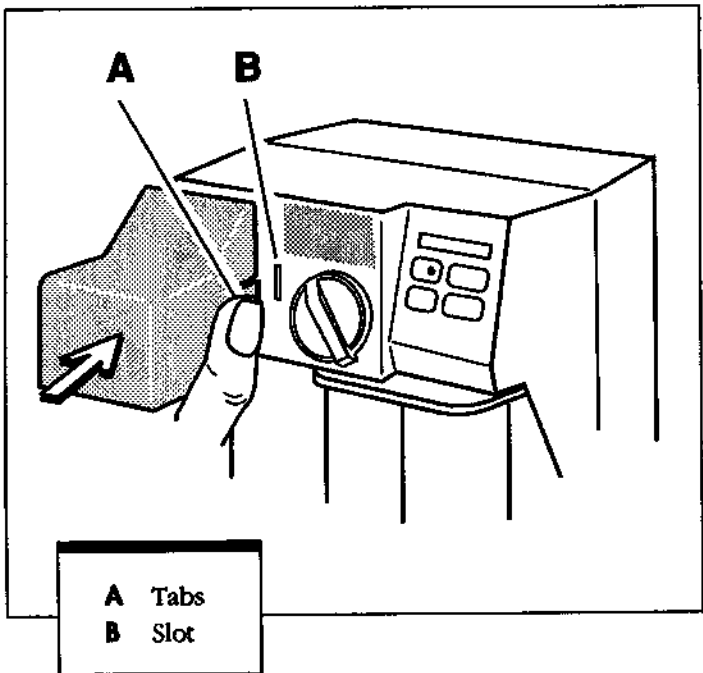
- 5. Purge air from the point-of-use filter by turning the vent cap on the filter until any trapped air escapes. Have a container ready to collect water produced during the purging process.
- 6. Tighten the vent cap on the Millipak 40 final filter. Hand tighten only; do not over tighten.



- 7. Turn the RECIRCULATION/PRODUCTION valve to RECIRCULATION.
- 8. Press OPERATE/STANDBY to put the system into the STANDBY mode. The display will read **STANDBY**.
- 9. Snap the point-of-use filter into the center of the point-of-use cover.



10. Install the cover over the Millipak 40 final filter by pressing the tabs on the sides of the cover; the tabs should pop into the slots in the system cabinet.



You are now ready to operate your Milli-Q Plus system.

3 OPERATION

Pre-Operation Checklist

Make sure you have done the following before you operate the Milli-Q Plus system:

- ☐ feed water connection made (page 8)
- ☐ correct QPAK purification pack inserted and retaining arm locked (page 10)
- ☐ trapped air purged from system (page 13)
- ☐ QPAK hydrated overnight
- ☐ point-of-use filter installed and purged (page 16)

If any of these items has not been completed, see Chapter 2, *Installation*, for instructions before operating your Milli-Q Plus system.

Operating The Milli-Q Plus System

There are two ways to operate the Milli-Q Plus system: directly from the unit and by remote control. This chapter describes direct operation of the Milli-Q Plus system. For instructions on how to operate the system by remote control, see Appendix 2.

During normal operation of the Milli-Q Plus system, make sure the isolating valve (if you installed one) is *always* open. The isolating valve should be closed only if you want to shut off the water supply to the system. If you turn off the system for more than one week, remove the QPAK and the Millipak 40 Final Filter.

■ DRAIN THE FIRST TWO LITERS OF WATER

The first time you use your Milli-Q Plus system, discard the first two liters of water. If you turn off the Milli-Q Plus system for any length of time, you should again drain the first two liters before collecting water for laboratory use. Stagnant water in the system (without periodic recirculation) will deteriorate in quality.

Note: If you are performing a low TOC application, drain the first 15 - 20 liters of water.

1. Turn on the pump by pressing OPERATE/STANDBY. Make sure the green power light is on. The system will be in the OPERATE mode.

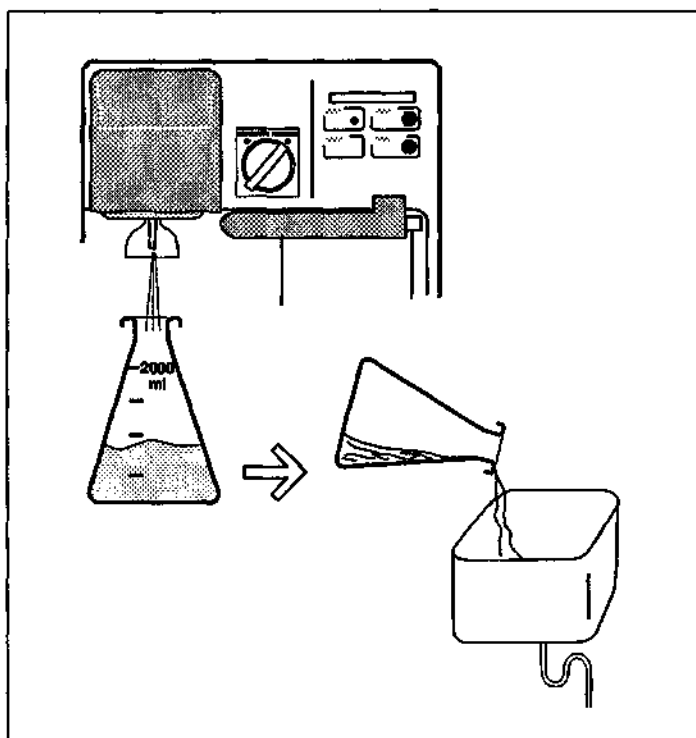
Note: Each time the pump is started in the OPERATE mode, the Milli-Q Plus system will automatically run through the Auto Test sequence to ensure proper water quality. The display will initially read **TEST: 15 M Ω cm** (± 1 megohm-cm). After 4 seconds, the display will show the actual resistivity of the water in the system (**PRODUCT: ___ M Ω cm**, up to 18.2 megohm-cm). This value may flash on and off if the actual resistivity in the system is below 14 megohm-cm (the set point). Once the actual resistivity builds to greater than 14 megohm-cm, the display will be steady.

2. Turn the RECIRCULATION/PRODUCTION valve to PRODUCTION.
3. Discard the first two liters of water that is produced.

4. Turn the RECIRCULATION/PRODUCTION valve to RECIRCULATION.

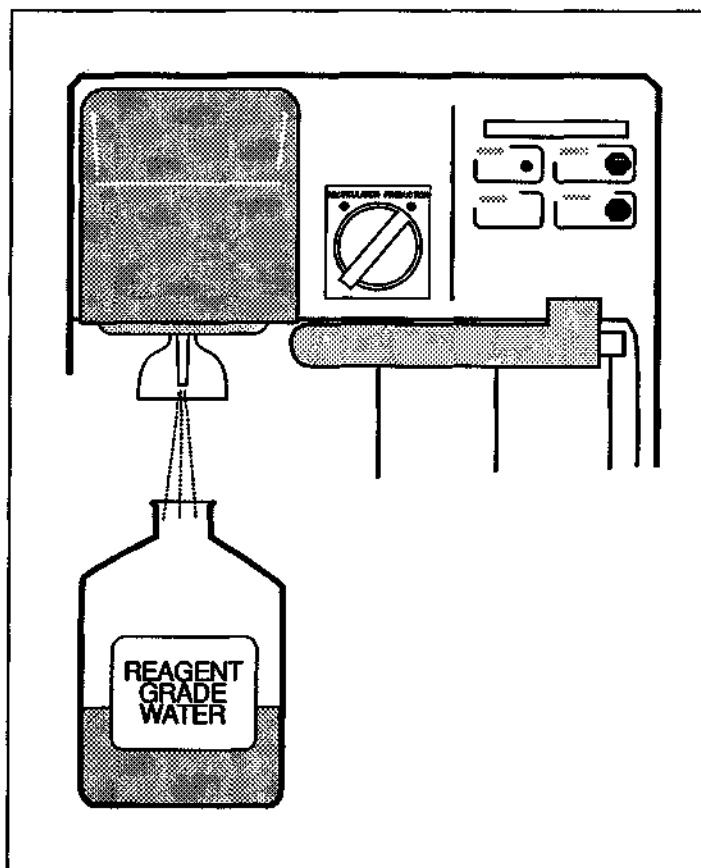
5. Press OPERATE/STANDBY to put the system into the STANDBY mode. The display will read **STANDBY**.

You are now ready to collect ultrapure, reagent-grade water for use in the laboratory.



■ COLLECT WATER FOR LABORATORY USE

1. Turn on the pump by pressing OPERATE/STANDBY.
2. Turn the RECIRCULATION/PRODUCTION valve to PRODUCTION.
3. Take your required volume of water.



4. When you are finished taking your water, turn the RECIRCULATION/PRODUCTION valve to RECIRCULATION.
5. Press OPERATE/STANDBY to return the system to the STANDBY mode. The display will read **STANDBY**.
6. When you need more ultrapure water, simply repeat steps 1 - 5.

CAUTION: You cannot take any water from your Milli-Q Plus system when the system is in the STANDBY mode. To maintain water quality between uses, the Milli-Q Plus system automatically recirculates the water in the system for 5 minutes every 55 minutes. During the 5 minutes that the water is recirculating, the display will read **RECIRCULATION**.

Make sure the RECIRCULATION/PRODUCTION valve is always turned to RECIRCULATION when the system is in the STANDBY mode. If the system is on PRODUCTION, water will leave the system during the periodic recirculation and your bench will become wet.

Note: If you wish, the setting for recirculation frequency can be changed so that water recirculates for 5 minutes every 3 hours (see Appendix 1). This should be done by a trained Millipore service representative.

Summary Of Milli-Q Plus System Functions

The chart below summarizes the system functions that you have learned during the installation and operation of your new Milli-Q Plus system. It also lists the messages that will be shown when a Milli-Q Plus system component needs to be replaced.

Action	Mode	Display
Press OPERATE/STANDBY (when in OPERATE)	STANDBY	STANDBY
Press OPERATE/STANDBY (when in STANDBY)	OPERATE	[see Auto Test below]
Turn valve to RECIRCULATION	STANDBY	STANDBY (55 min) RECIRCULATION (5 min)
Turn valve to PRODUCTION	OPERATE	PRODUCT: ___ M Ω cm (actual resistivity; water delivered to point of use)
Press TEMPERATURE	STANDBY	TEMPERATURE: 25°C (4 sec; calibration temp)
Press TEMPERATURE	OPERATE	TEMPERATURE: ___ °C (4 sec; actual temperature)

Automatic Function	Mode	Display
Auto Test (when you press OPERATE)	OPERATE	TEST: 15 M Ω cm ± 1 megohm-cm (4 sec) PRODUCT: ___ M Ω cm (actual resistivity)
Automatic recirculation	STANDBY	RECIRCULATION

Replacement Item	Mode	Display
QPAK purification pack needs to be replaced	[either mode]	amber lamp flashes

Several Milli-Q Plus system components are expendable:

Component	Lifetime
Millipak 40 final filter	variable
QPAK purification pack	4 - 6 months

Chapter 4, *Maintenance*, provides instructions for replacing exhausted components. If you encounter problems with your Milli-Q Plus system, see Chapter 5, *Troubleshooting The Milli-Q Plus System*, to help diagnose and solve problems you might encounter with the system. You can also telephone Millipore Technical Service for assistance; see pages 33 and 34.

4 MAINTENANCE

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System Shutdown

If your Milli-Q Plus system will be turned off for more than one week, remove the expendable components:

1. Turn the RECIRCULATION/PRODUCTION valve to RECIRCULATION.
2. Turn off the power to the Milli-Q Plus system.
3. If you installed an isolating valve, close it.
4. Remove the QPAK purification pack and discard.
5. Remove the Millipak 40 final filter and discard.

When you wish to operate your Milli-Q Plus system again, open the isolating valve and turn on the power. Then follow the instructions in Chapter 2 to install a new QPAK purification pack, clear trapped air, and install a new Millipak 40 final filter. Drain the first two liters of water produced before collecting ultrapure, reagent-grade water for use in the laboratory.

Changing The QPAK Purification Pack

The EXCHANGE PACK lamp indicator will flash automatically 4 months after the installation of the QPAK purification pack, indicating the age of the QPAK. For optimum removal of TOC and microorganisms, Millipore recommends that you change the purification pack when the lamp flashes. However, the ion exchange capacity of the QPAK might not be exhausted and the purification pack might still be capable of producing "ion-free" 18.2 M Ω cm water. Replace the QPAK purification pack at the end of the day to allow the activated carbon in the pack to hydrate overnight.

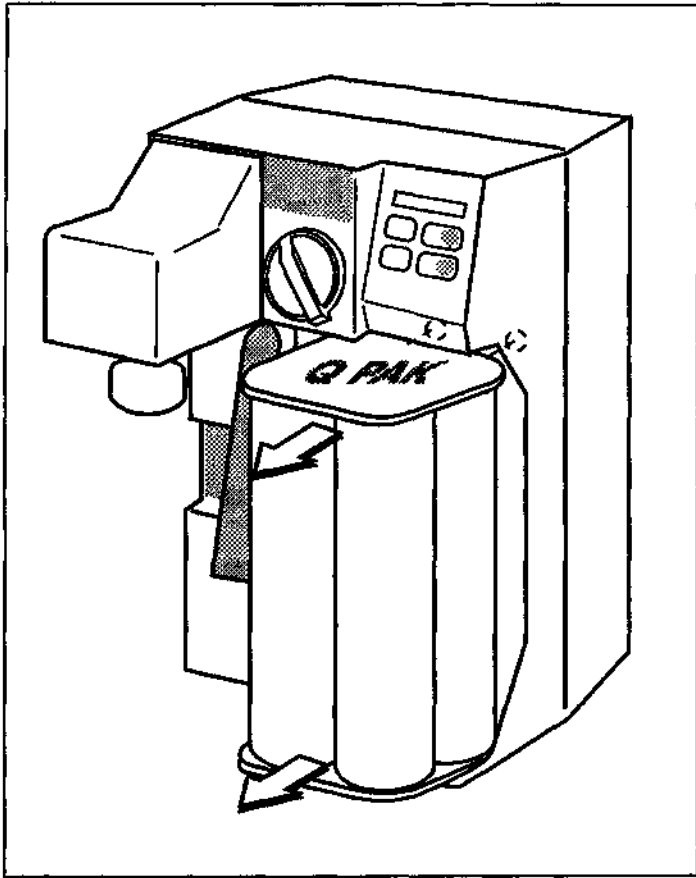
If product resistivity readings decrease to an unacceptable level (below 10 megohm-cm), replace the purification pack. To order a new QPAK purification pack, see pages 35 and 36.

By adjusting the PC board, the preset time for EXCHANGE PACK can be changed to six months (see Appendix 1). This should be done by a trained Millipore service representative.

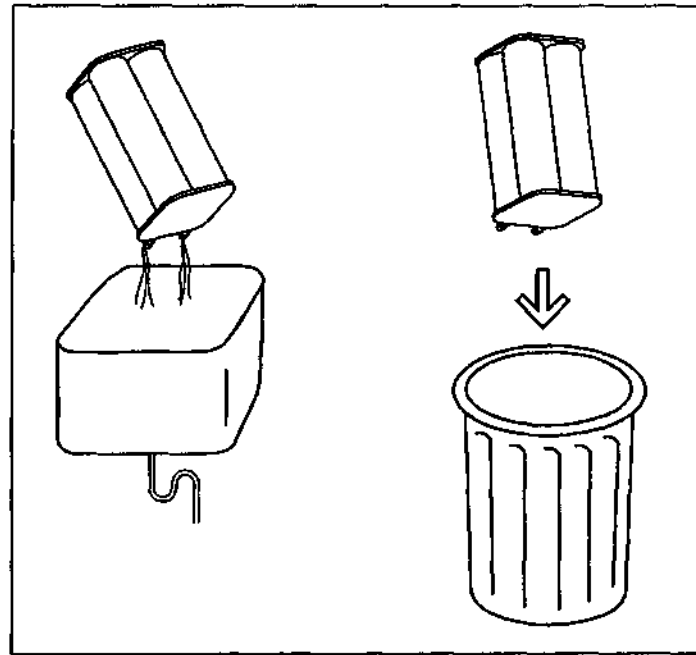
To change the QPAK purification pack:

1. Make sure the system is in the STANDBY mode.
2. Turn the RECIRCULATION/PRODUCTION valve to PRODUCTION and allow any excess water to drain from the system. Then return the valve to the RECIRCULATION position; this will depressurize the purification pack.

3. Unlock the pack retaining arm on the Milli-Q Plus system and remove the pack by pulling it straight out of the system. Hold the Milli-Q Plus system with one hand while you remove the pack with the other hand.



4. Drain excess water from the used pack and discard the pack.



Note: The used pack must be removed from the system for at least 10 seconds before the new pack is installed in order to reset the EXCHANGE PACK timer.

5. Insert the new pack into the unit (see page 10 if you do not recall how to do this).

CAUTION: If the amber EXCHANGE PACK lamp is lit continuously, the QPAK purification pack might be loose. Make sure the purification pack is securely in place and the pack retaining arm is locked.

6. If you closed an isolating valve, open it.
7. Unscrew the Millipak 40 final filter from the connector.
8. Clear trapped air from the pack, then replace and vent the Millipak 40 final filter.
9. Allow the system to sit in STANDBY overnight.
10. After 12 hours or in the morning, drain the first two liters of water produced by the system (15 - 20 liters if you are performing a low TOC application); see page 19 if you do not recall how to do this.

Note: As usual, the display will show **TEST: 15 M Ω cm** (± 1 megohm-cm) when the pump begins operating. After 4 seconds, the display will show the actual resistivity of the water.

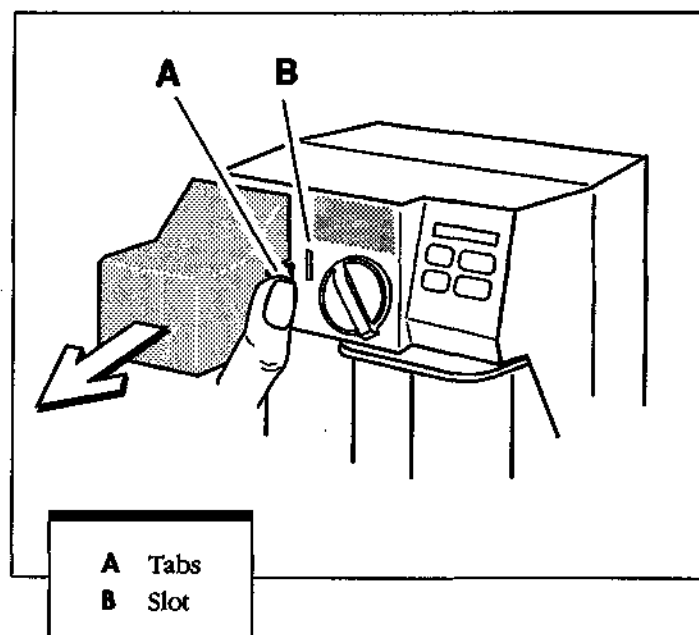
You are now ready to operate your Milli-Q Plus system again.

Changing The Millipak 40 Final Filter

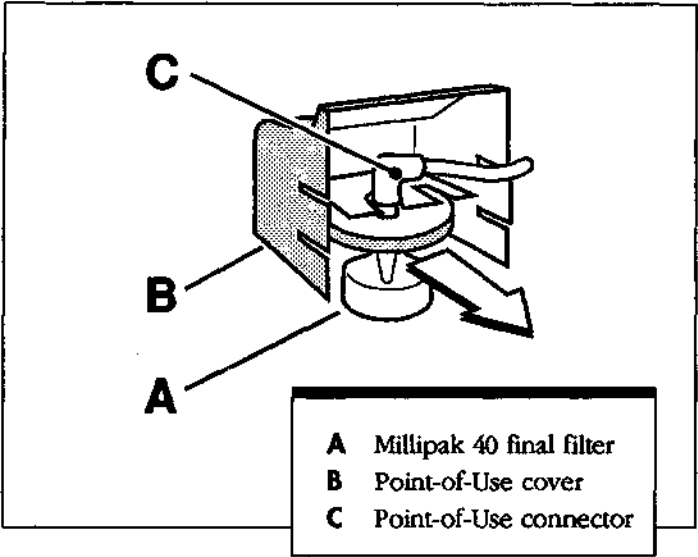
The Millipak 40 final filter should be changed when the flow rate of water leaving the system decreases to an unacceptable level (5 L/m) or when you change the QPAK purification pack. The useful lifetime of the Millipak 40 final filter depends on the quality of your feed water and how much you use the system. See pages 35 and 36 for ordering information.

To change the Millipak 40 final filter:

1. Make sure the system is in the STANDBY mode.
2. Press the tabs on the sides of the point-of-use cover to remove it from the system.
3. Snap the Millipak 40 final filter out of the cover and set the cover aside.



4. Unscrew the Millipak 40 final filter from the connector and discard.



5. Follow the instructions in Chapter 2, *Installation*, to install and vent the new Millipak 40 final filter (steps 1 - 10 on pages 16-18).

You are now ready to operate your Milli-Q Plus system again.

Replacing The Fuse

If the green power light is not lit, you may need to replace the fuse. For ordering information, see pages 35 and 36.

Before replacing the main power fuse, make sure that:

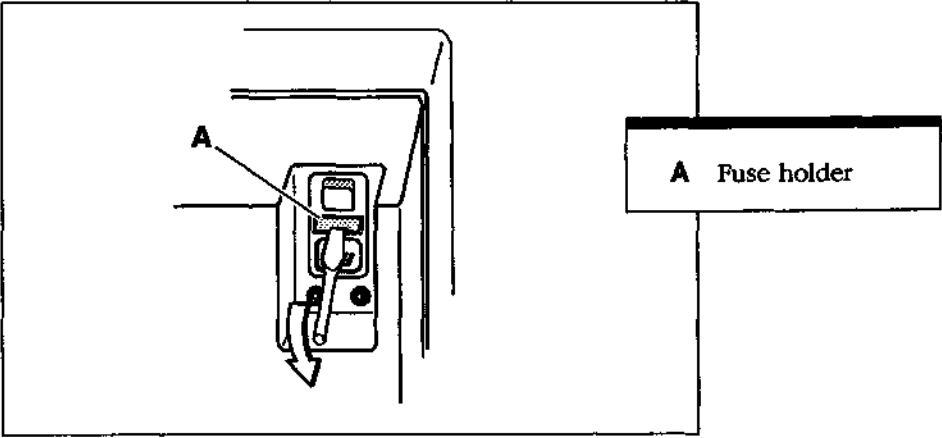
- the power cord is plugged in
- the power switch is on
- the green power lamp is not lit

If these conditions are met, replace the fuse:

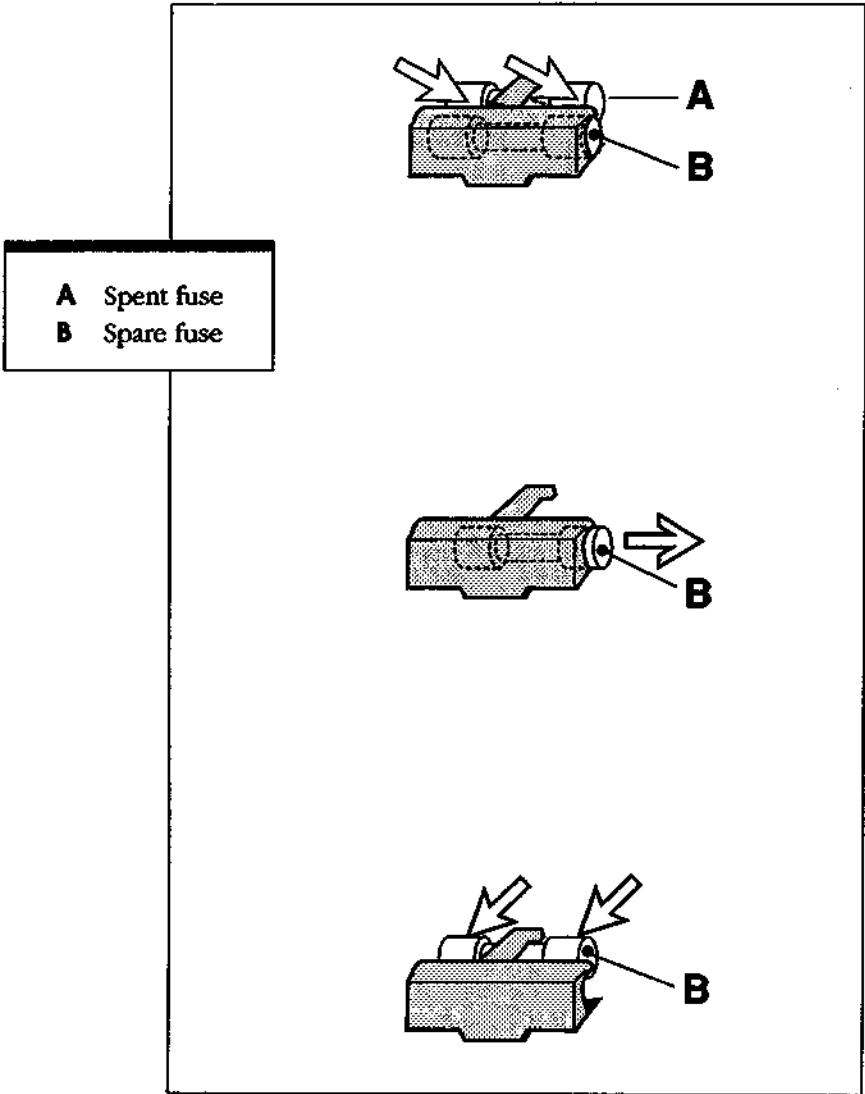
1. Turn off the Milli-Q Plus system.
2. Unplug the unit from the power supply and disconnect the power cord from the unit.

WARNING: Make sure the Milli-Q Plus system is completely disconnected from any source of power before continuing. This is a high voltage system.

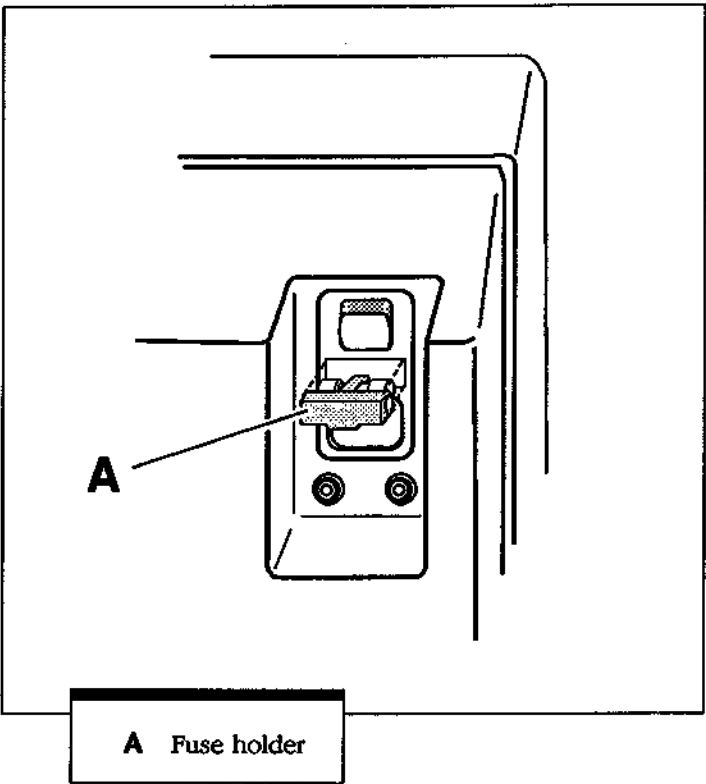
3. Place a small screwdriver into the fuse holder and gently pry out the fuse holder.



4. Remove the spent fuse and set aside. *Save the fuse until you have turned on the system and confirmed that the system power lamp lights up.*
5. Insert the spare fuse (found in the fuse holder) into the fuse socket.



6. Replace the fuse holder into the plug socket by pressing on the fuse holder until it clicks into place.



7. If you closed an isolating valve, open it.
8. Reconnect the Milli-Q Plus system to the power supply.
9. Turn on the power. The display will read **RECIRCULATION** for 5 minutes, then **STANDBY**.

Note: Each time the power is turned on, water will recirculate for 5 minutes and the system will automatically go into the **STANDBY** mode. If you press **OPERATE/STANDBY** during these 5 minutes, the system will automatically go into the **OPERATE** mode upon completing the recirculation cycle. If you press **OPERATE/STANDBY** *twice*, the system will go into the **STANDBY** mode.

If the power lamp still is not lit, save both fuses. You may need to replace the fuse on the PC board. See Appendix 1, or telephone Millipore Technical Service for assistance; see pages 33 and 34.

5 TROUBLESHOOTING THE MILLI-Q PLUS SYSTEM

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The chart below will help you diagnose and solve problems that you might encounter with the Milli-Q Plus system. If you are unsure what the problem is, or how to approach solving a problem, telephone Millipore Technical Service for assistance; see pages 33 and 34.

Problem	Cause	Solution
Power light off	power switch off power cord not connected main power fuse blown PC board fuse blown	make sure power switch is on make sure power cord is connected change fuse, see page 28 call Millipore Technical Service, see pages 33 and 34, or see Appendix 1
Power light on, in OPERATE mode, no product flow	RECIRCULATION/PRODUCTION valve in RECIRCULATION position pump not running inlet solenoid valve closed	make sure valve is turned to PRODUCTION call Millipore Technical Service, see pages 33 and 34 call Millipore Technical Service, see pages 33 and 34
Low product flow	low feed pressure inadequate water supply to pump inadequate water supply to pump inadequate water supply to pump point-of-use filter airlocked point-of-use filter plugged RECIRCULATION/PRODUCTION valve partially closed	make sure pressure is at least .5 psi - 15 psi (.03 bar - 1 bar) if you have installed an isolating valve, make sure it is open make sure the pump is primed (make sure that the feed tank is full) purge the system of air, see page 13 vent the point-of-use filter, see page 16 replace point-of-filter, see page 27 make sure valve is completely turned to PRODUCTION

Problem	Cause	Solution
Low product quality	QPAK purification pack exhausted air in system QPAK not hydrated overnight	replace purification pack, see page 25 purge air; ensure at least 5 psi pressure on pump feed to avoid sucking in air hydrate QPAK overnight
Water at bottom of pack	pack not secured pack-receiving micro-switch not working leak at RECIRCULATION/ PRODUCTION valve	make sure pack retaining arm is locked in place call Millipore Technical Service, see pages 33 and 34 call Millipore Technical Service, see pages 33 and 34
Display reads TEST INCORRECT when system autotests	temperature or resistivity miscalibrated	call Millipore Technical Service, see pages 33 and 34, or see Appendix 1
Display shows TEMPERATURE < 0 °C or TEMPERATURE > + °C	feed water temp elevated thermistor damaged	make sure feed water temperature is between 5°C and 40°C (40°F and 104°F) call Millipore Technical Service, see pages 33 and 34
Display shows resistivity XX.X	system is trying to read higher than 18.2 M Ω cm	there might be air in resistivity cell; purge air from system by draining water



Technical Assistance

For technical assistance with your Millipore product, contact your local Millipore sales or service representative, or telephone the Millipore office nearest you.

In North America, you can telephone the Technical Service Department toll-free at 800-225-1380. You can also telephone:

In Western United States:	800-632-2708
In Canada:	800-268-4881
In Puerto Rico:	800-747-8444
In Toronto:	416-678-2161
In Massachusetts:	617-275-9200

Outside of North America, contact:

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Millipore Intertech
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Yvelines Cedex France
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Telex 695430 militec

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In Sydney Area
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Telex 25934 MILLIP

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Tel. (0222) 82 89 26
Telex 131464 miliv a

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Millipore S.A.-N.V.
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Rakestraat 60
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Telex 22798 milwat b

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Telex 06-968513 MILLIPORE
MSGA

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Millipore A/S
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Tel. (42) 52 88 11
Telex 33544 MILLIP DK

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Mexico Millipore S.A. de C.V. Avenida Ingenieros Militares 85-PB México 11230 D.F. Mexico Tel. (905) 576-9688 Telex 1777 442 MISAME	Singapore Millipore Pty. Ltd. #26-03 United Square 101 Thomson Road Singapore 1130 Singapore Tel. 2532733 Telex 56556 MILLIP	U.K. and Ireland Millipore (U.K.) Ltd. "The Boulevard" Blackmoor Lane Watford, Hertfordshire WD1 8YW England Tel. (0923) 81 6375 Telex 24191 milpor g
The Netherlands Millipore B.V. Penningweg 33 Postbus 166 4870 AD Etten-Leur (N.B.) The Netherlands Tel. (01608) 22000 Telex 54 840 milwa nl	Spain Millipore Ibérica, S.A. Avenida del Llano Castellano, 13-3 Spain Tel. (91) 729.03.00 Telex 23545 milli e Millipore Ibérica, S.A. Entenza 28, Entla 08015 Barcelona Spain Tel. (93) 325.96.16 Telex 50524 wtrs e Telex 21064 milipor s	West Germany Millipore GmbH Hauptstrasse 87 6236 Eschborn Federal Republic of Germany Tel. (6196) 494-0 Telex 40 72 704 mil d
Norway Millipore AB Enebakkveien 133 0680 Oslo 6 Norway Tel. (02) 67 82 53	Sweden Millipore AB Box 233 421 23 Vaestra Frölunda Sweden Tel. 031-028 98 60 Telex 21064 milipor s Millipore AB Grahamsvägen 15 172 46 Sundbyberg Sweden Tel. 08-98 89 60	In All Other Countries Millipore Intertech P.O. Box 255 Bedford, MA 01730 U.S.A. Tel. (617) 275-9200 Telex 4430066 MILIPR UI

Ordering Information

	Description	Catalogue Number
MILLI-Q PLUS SYSTEM	Milli-Q Plus system, 110 V/60 Hz Milli-Q Plus system, 220 V/50 Hz	ZD52 115 84 ZFMQ 050 01
EXPENDABLES	Millipak 40 final filter unit, .22 µm sterile w/ 1/4" NPTM inlet, 2/package	MPGL 04S K2
For RO or distilled feed water:	Starter Kit (1 QPAK ₁ purification pack and 1 Millipak final filter unit, .22 µm) Purification Pack QPAK ₁ (without Millipak 40)	CPMQ K05 RI CPMQ 004 R1
For DI feed water:	Starter Kit (1 QPAK ₂ purification pack and 1 Millipak final filter unit, .22 µm) Purification Pack QPAK ₂ (without Millipak 40)	CPMQ K05 D2 CPMQ 004 D2
ACCESSORIES	Delrin™ isolating valve Pressure regulator kit Wall mounting bracket 1/4" male - 8 mm tubing quick connector 6.25 mm jack connector, male Pressure switch FTPF 006 09	XX11 000 01 ZFMQ 000 PR ZFMQ 00W MB FTPF 026 30 FTPF 023 95 FTPF 006 08
SPARE PARTS	Feed water tubing, 8 mm OD, polyamide Main power fuse, 1 amp/250 V Slo-Blo (for 110 V/60 Hz system) Main power fuse, .5 amp/250 V Slo-Blo, (for 220 V/50 Hz system) PC board fuse, .16 amp Slo-Blo (for 110 V/60 Hz system) PC board fuse, .1 amp Slo-Blo, (for 220 V/50 Hz system)	FTPF 027 21 FTPF 007 56 FTPF 003 06 FTPF 030 00 FTPF 029 99

	Description	Catalogue Number
SPARE PARTS (con't)	Allen wrench, M5 (to remove front cover)	ZF20 000 70
	Check Valve	FTPF 027 18
	PC board control (for 110 V system)	ZF20 000 51
	PC board Control (for 220 V system)	ZF20 000 50
	1/4" male - 6 mm tubing quick connector	FTPF 027 10
	Iwaki™ pump (for 110 V system)	FTPF 024 73
	Iwaki pump (for 220 V system)	FTPF 017 82
	Jack connector, female with cable	ZF20 000 21
	Printed circuit keyboard	FTPF 026 05
	LCD display, 16 digits with cable	ZF20 000 30
	Level switch with cable (for 60 L feed tank)	XHJM 000 02
	Pack adapter with thread, 1/4"	ZF20 000 09
	Pack microswitch with cable	ZF20 000 20
	Point-of-Use cover	FTPF 025 57
	Polyamide tubing, 6 mm O.D.	FTPF 027 20
	Power cord line, 110 V	FTPF 024 71
	Power cord line, 220 V	FTPF 018 66
	PVDF 3-way valve, 1/4"	FTPF 017 76
	Solenoid valve body, stainless steel	FTPF 024 66
	Solenoid valve coil (for 110 V system)	FTPF 024 68
	Solenoid valve coil (for 220 V system)	FTPF 024 67
	Solenoid valve connector	FTPF 003 96
	Top door	FTPF 025 56
	1/2" female - 1/4" female threaded reducing bushing, with built-in stainless steel screen and rubber gasket	ZF20 000 80
	1/4" male - 8 mm tubing quick connector	FTPF 026 30
	3-way valve knob	FTPF 025 58

Specifications

Components Cabinet Cabinet accessories Check valve Fittings Hardware (screws, nuts, washers) Inlet screen Inlet solenoid valve Internal skeleton Microsensor tips O-rings Point-Of-Use fittings Point-Of-Use tubing Pump body Pump materials (contacting fluid) Resistivity sensor Tubing 3-way valve	Materials of Construction polypropylene polyamide copolymer acetal resin copolymer acetal resin/nylon stainless steel stainless steel 316 stainless steel Noryl™ (polyamide) 316 stainless steel, electropolished nitrile (EPDM) PVDF PTFE 316 stainless steel stainless steel, Noryl (polyamide) 316 stainless steel, electropolished polyamide PVDF
Connections Feed connector Product connector	Specifications polyamide tubing, 8 mm O.D. 1/4" NPTF connector, PVDF
Dimensions Height Width Depth Shipping weight Operating weight	Specifications 495 mm (19.5 in) 297 mm (11.7 in) 433 mm (17.0 in) 9.3 kg (20.5 lb) (without pack) 15.4 kg (34.0 lb) (with pack and water)
Electrical Requirements 115 V/60 Hz, .8 amp fuse size: 1 amp/250 V, Slo-Blo (provided) 220 V/50 Hz, .4 amp fuse size: .5 amp/250 V, Slo-Blo (provided)	

Feed Water Requirements Feed water pressure Operating temperature	Specifications minimum: .5 psi (.03 bar) maximum: 15 psi (1 bar) 5°C - 40°C (41°F - 104°F)
Pump and Motor Bypass adjustment maximum pressure Electrical Maximum discharge pressure Pump Type	Specifications 40 ± 2 psi (2.67 ± .13 bar) 115 V/60 Hz, .43 amps or 220 V/50 Hz, .25 amps 43 psi (3 bar) positive displacement magnetic gear
System Performance Product quality* Water production rate	Specifications meets or exceeds ASTM, CAP, ACS, and NCCLS standards for Type I, reagent-grade water 1.5 L/m (.4 g/m) (maximum)

* Water quality will deteriorate if water is stored.

Warranty

Millipore Corporation ("Millipore") warrants the products manufactured by it against defects in materials and workmanship when used in accordance with the applicable instructions for a period of one year from the date of shipment of the products. MILLIPORE MAKES NO OTHER WARRANTY, EXPRESSED OR IMPLIED. THERE IS NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. The warranty provided herein and the data, specification and descriptions of Millipore products appearing in Millipore's published catalogues and product literature may not be altered except by express written agreement signed by an officer of Millipore. Representations, oral or written, which are inconsistent with this warranty or such publications are not authorized and if given, should not be relied upon.

In the event of a breach of the foregoing warranty, Millipore's sole obligation shall be to repair or replace, at its option, any product or part thereof that proves defective in materials or workmanship within the warranty period, provided the customer notifies Millipore promptly of any such defect. The exclusive remedy provided herein shall not be deemed to have failed of its essential purpose so long as Millipore is willing to repair or replace any nonconforming Millipore product or part. Millipore shall not be liable for consequential damages resulting from economic loss or property damages sustained by a customer from the use of its products.

However, in some states the purchaser may have rights under state law in addition to those provided by this warranty.

APPENDIX 1 : Advanced Maintenance and Troubleshooting

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WARNING: Working on the PC board will void the warranty for your Milli-Q Plus system. The information in this appendix is intended for your information only. Millipore recommends that you telephone Millipore Technical Service if you encounter problems beyond the scope of simple maintenance. If you wish to work on the PC board yourself, please do so at your own risk.

Adjusting The PC Board

If you encounter problems with your Milli-Q Plus system you can check the PC board. This appendix includes instructions for:

- changing the PC board fuse
- adjusting the temperature potentiometer
- adjusting the resistivity potentiometer
- adjusting the LCD contrast potentiometer
- changing the pack replacement frequency setting
- changing the recirculation frequency setting

CAUTION: When working on the PC board, use extreme care. The electronic components are delicate and can be easily damaged. In addition, the connectors on the PC board carry high voltages.

Regardless of which maintenance function is performed, the steps for accessing the PC board and reassembling the system are the same.

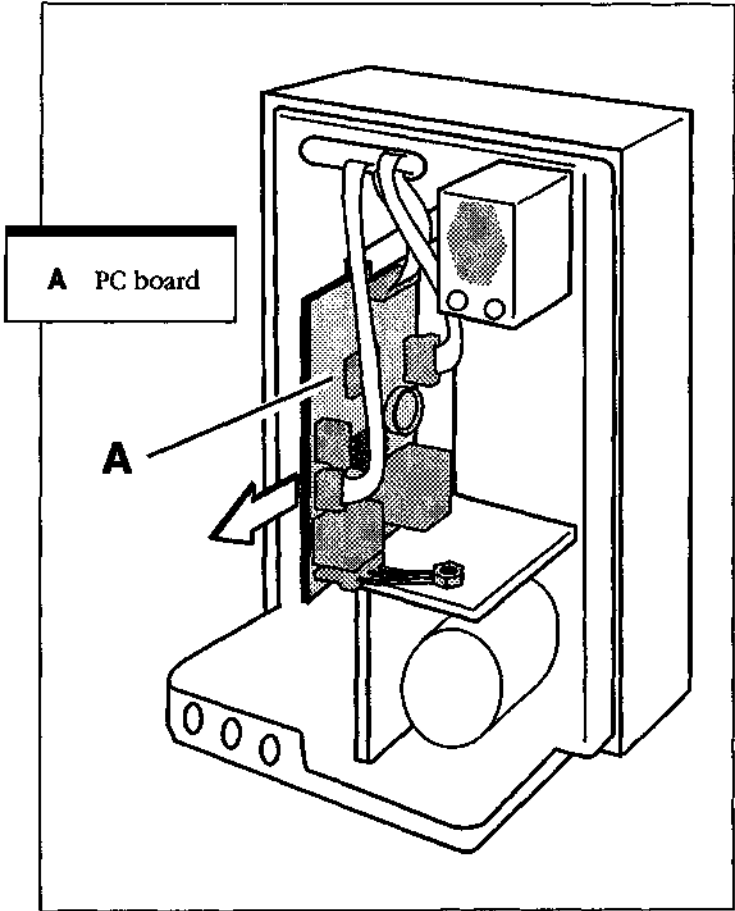
■ TO ACCESS THE PC BOARD

1. Turn off the power to the Milli-Q Plus system and unplug the power cord.

WARNING: The cables on the PC board carry high voltages. Proceed with caution.

2. Open the back cover on the Milli-Q Plus system by turning the handwheel and lifting off the cover.

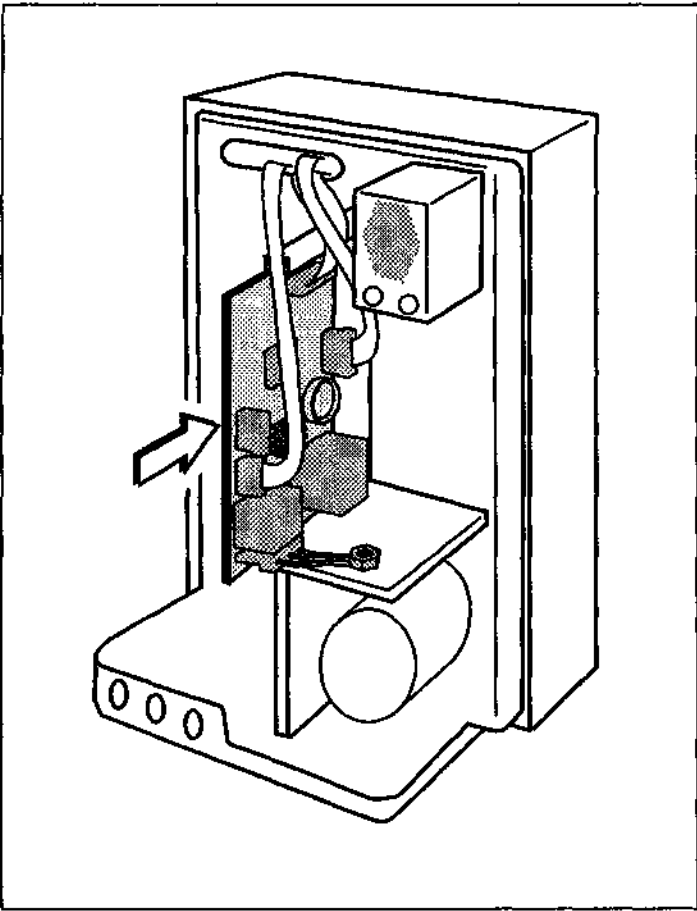
3. Pull the PC board out of the unit as far as possible without disconnecting the connectors.



4. Plug in the power cord and turn on the power. The display will read **RECIRCULATION** for 5 minutes, then **STANDBY**.

■ TO REASSEMBLE THE MILLI-Q PLUS SYSTEM

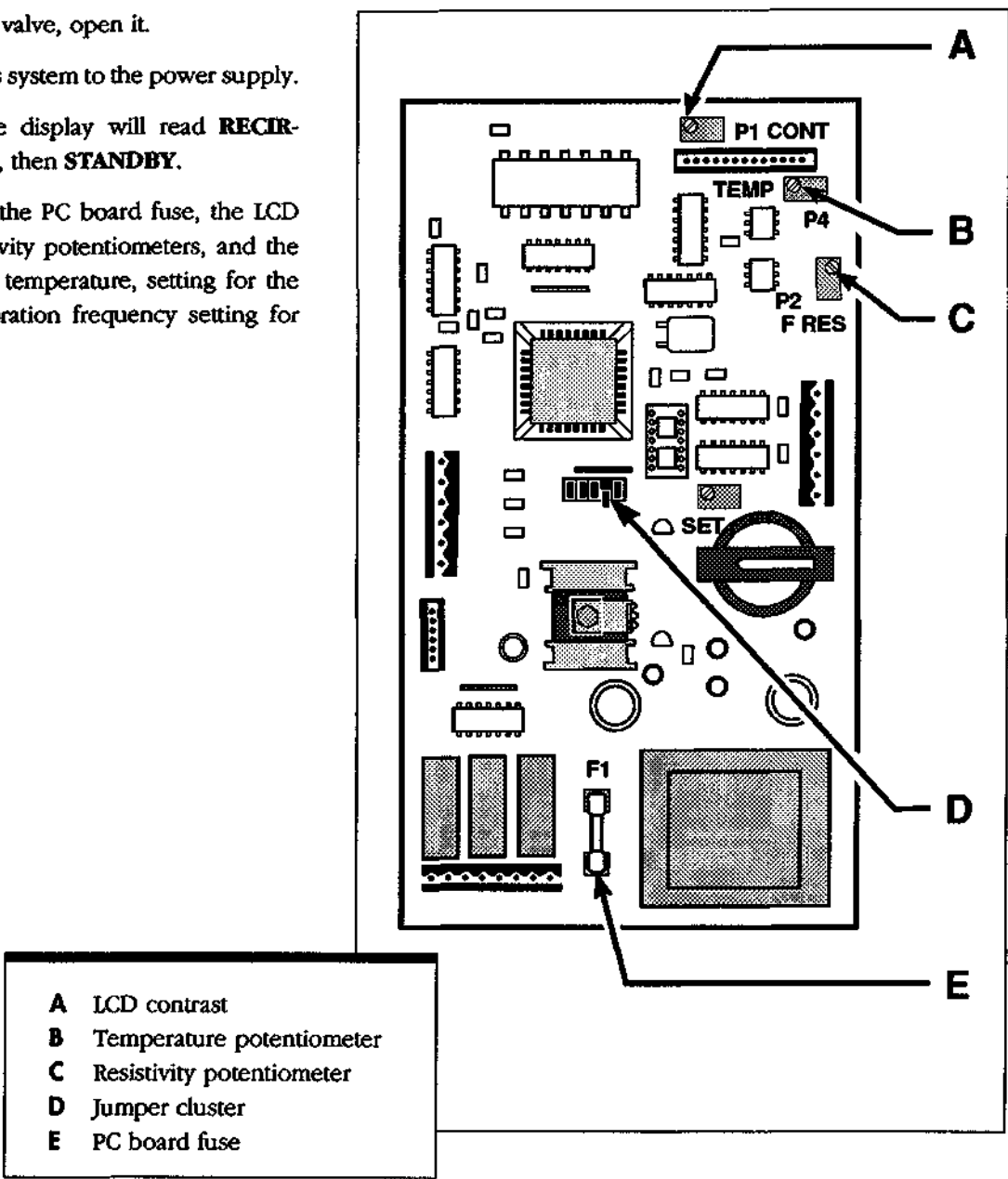
- 1. Turn off the power and unplug the power cord.
- 2. Slide the PC board back into the cabinet.



3. Replace the back cover, washer, and handwheel. Hand tighten the handwheel; do not over tighten.

4. If you closed an isolating valve, open it.
5. Reconnect the Milli-Q Plus system to the power supply.
6. Turn on the power. The display will read **RECIRCULATION** for 5 minutes, then **STANDBY**.

On the PC board you will find the PC board fuse, the LCD contrast, temperature and resistivity potentiometers, and the jumper cluster for changing the temperature, setting for the purification pack, and the calibration frequency setting for automatic recirculation.



■ **CHANGING THE FUSE ON THE PC BOARD**

If the green system power light is off, the PC board fuse may need to be replaced. First make sure that:

- the power switch is on
- the power cord is connected
- the main power fuse is fresh

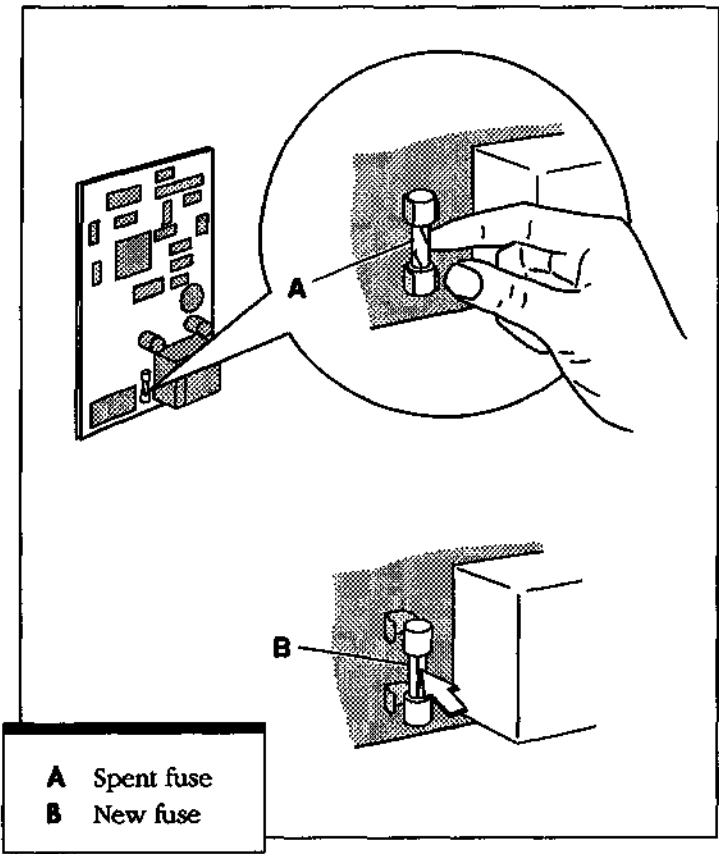
If these conditions are met and the power lamp is still off, you can replace the PC board fuse. See pages 35 and 36 for ordering information.

To replace the PC board fuse:

1. Follow steps 1 - 3 on pages 39 and 40 to access the PC board.

WARNING: Do not plug in the power cord or turn on the power.

2. You will find the PC board fuse in the center of the bottom portion of the PC board. To replace the fuse, lift the fuse carefully out of the socket and set it aside.
3. Replace the old fuse with a new fuse.
4. Follow steps 2 - 5 on pages 40 and 41 to reassemble the system. If the system power light does not go on, telephone Millipore Technical Service for assistance; see pages 33 and 34.



■ ADJUSTING THE TEMPERATURE POTENTIOMETER

You may need to recalibrate the temperature potentiometer if the display reads **TEST INCORRECT** when the system auto tests. Before you adjust the temperature potentiometer, make sure the feed water temperature is between 5°C and 40°C. If it is not in this temperature range, correct the feed water temperature. If the display still reads **TEST INCORRECT**, the temperature potentiometer needs to be recalibrated.

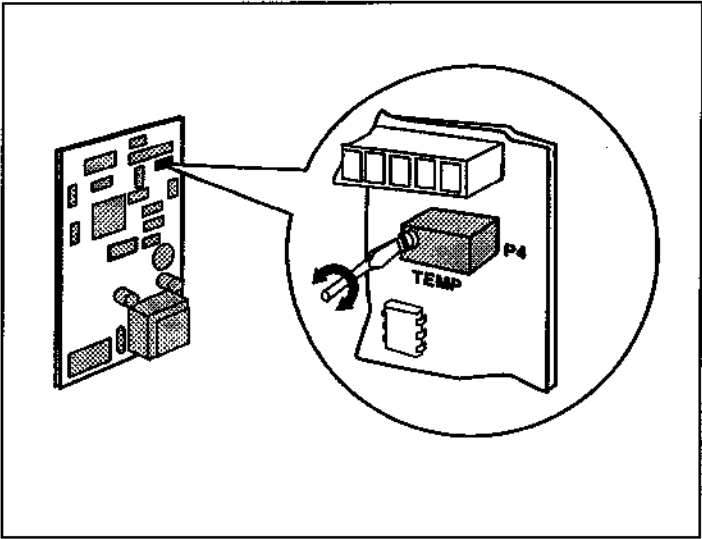
To recalibrate the temperature potentiometer:

1. Follow steps 1 - 4 on pages 39 and 40 to access the PC board.
2. Press the **TEMPERATURE** button while the system is in the **STANDBY** mode. The display will show the test calibration temperature: **TEMPERATURE: ____ °C**.

Note: If the test temperature reads 25°C, you do not need to recalibrate the temperature potentiometer. However, you may need to adjust the resistivity potentiometer (see the section below).

3. While continuing to press the **TEMPERATURE** button, adjust the temperature potentiometer (labeled "P4TEMP") by turning the screw with a small screwdriver. Turning the screw to the left increases the temperature setting; turning the screw to the right decreases the temperature setting. Gently turn the screw until the temperature reads 25°C.

Note: There is a red seal on the potentiometer. You will break this seal as you adjust the potentiometer with the screwdriver.



4. Release the temperature button. The display will read **STANDBY**.

5. Follow steps 1 - 6 on page 40 and 41 to reassemble the system.

If the display reads **TEMPERATURE: < °C** or **TEMPERATURE: > °C** when the system auto tests, the thermistor is damaged. Telephone Millipore Technical Service for assistance; see pages 33 and 34.

■ ADJUSTING THE RESISTIVITY POTENTIOMETER

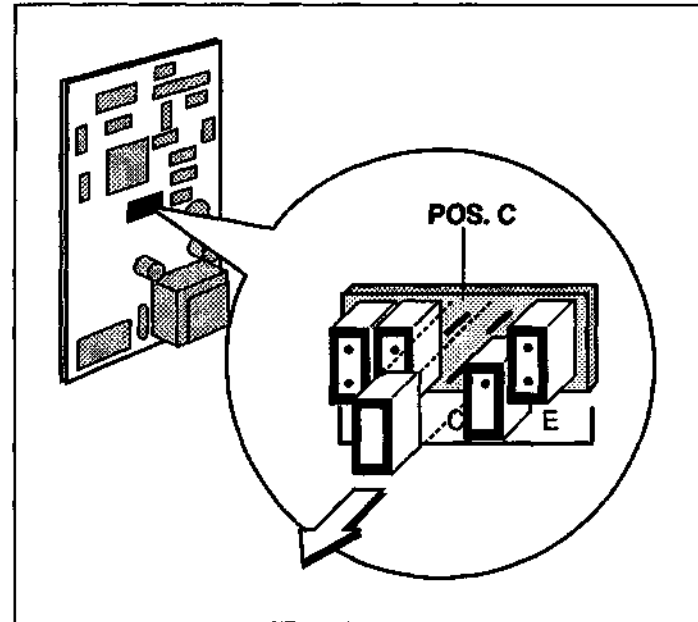
You may need to recalibrate the resistivity potentiometer if:

- the display reads **TEST INCORRECT** when the system auto tests and the temperature potentiometer is properly calibrated
- the test resistivity is not 15 ± 1 megohm-cm (display does not read **TEST: 15 M Ω cm**)

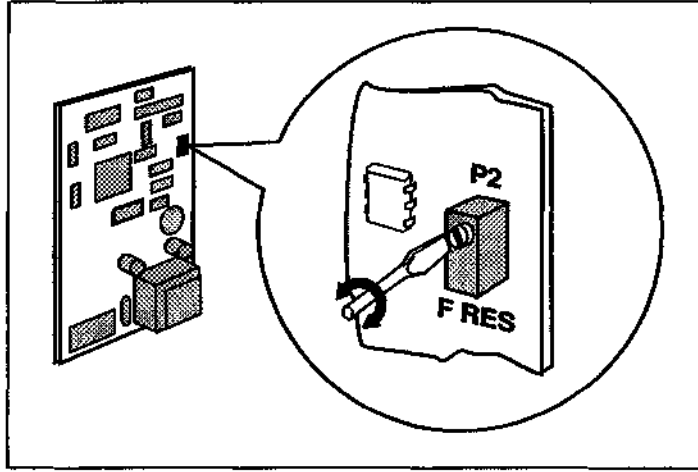
Before recalibrating the resistivity potentiometer, make sure the calibration temperature is 25°C (see the section above).

To recalibrate the resistivity potentiometer:

1. Follow steps 1 - 4 on pages 39 and 40 to access the PC board.
2. Remove Jumper C to lock the PC board in the test mode. The display will read **TEST: __ M Ω cm**.



3. Adjust the resistivity potentiometer (labeled "P2 RES") by turning the screw with a small screwdriver. Turning the screw to the left increases the resistivity setting; turning the screw to the right decreases the resistivity setting. Gently turn the screw until the display reads **TEST: 15 M Ω cm (\pm 1 megohm-cm).**



Note: There is a red seal on the potentiometer. You will break this seal as you adjust the potentiometer with the screwdriver.

4. Replace Jumper C.
5. Press TEMPERATURE to make sure that the temperature is set at 25°C. If the display does not read 25°C, adjust the temperature potentiometer (see page 43).
6. Follow steps 1 - 6 on pages 40 and 41 to reassemble the system.

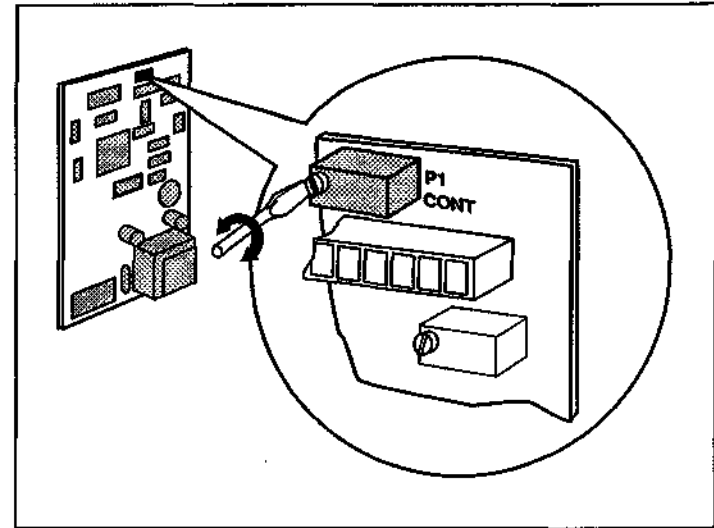
Note: The resistivity set point can be changed upon request. Telephone Millipore Technical Service for assistance; see pages 33 and 34.

■ ADJUSTING THE LCD CONTRAST POTENTIOMETER

The contrast of the LCD display can be changed by adjusting the LCD contrast potentiometer.

To adjust the potentiometer:

1. Follow steps 1 - 4 on pages 39 and 40 to access the PC board.
2. Adjust the contrast by turning the screw on the potentiometer with a small screwdriver. The LCD contrast potentiometer is labeled "P1 CONT" on the PC board. Turning the screw to the left decreases contrast; turning the screw to the right increases contrast.



Note: There is a red seal on the potentiometer. You will break this seal as you adjust the potentiometer with the screwdriver.

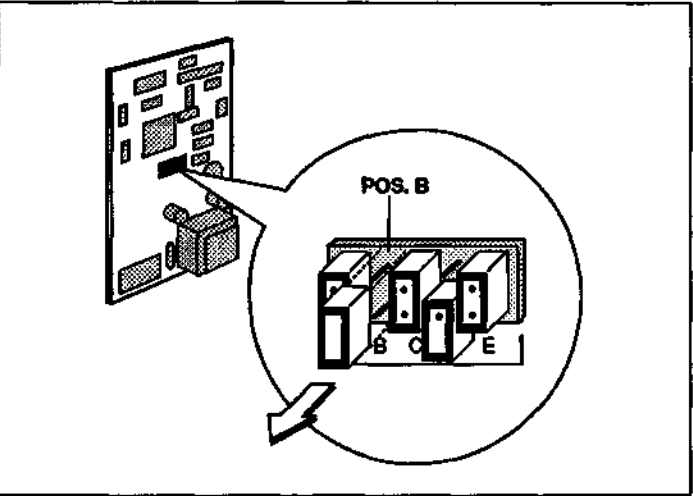
3. Follow steps 1 - 6 on pages 40 and 41 to reassemble the system.

■ **CHANGING THE FREQUENCY SETTING FOR THE PURIFICATION PACK**

The amber EXCHANGE PACK light will flash after the QPAK purification pack has been in place for 4 months. For optimum removal of TOCs and microorganisms, Millipore recommends this setting. If you wish, the setting for pack replacement frequency can be changed to 6 months.

To change the setting to 6 months:

- 1. Follow steps 1 - 3 on pages 39 and 40 to access the PC board.
- 2. Remove Jumper B; connect it to one of the contacts (so that it remains steady on the PC board), but make sure that it does not bridge the contacts. If Jumper B is connected across the contacts on the PC board, the frequency setting will be 4 months; if it does not bridge the contacts, the frequency setting will be 6 months.



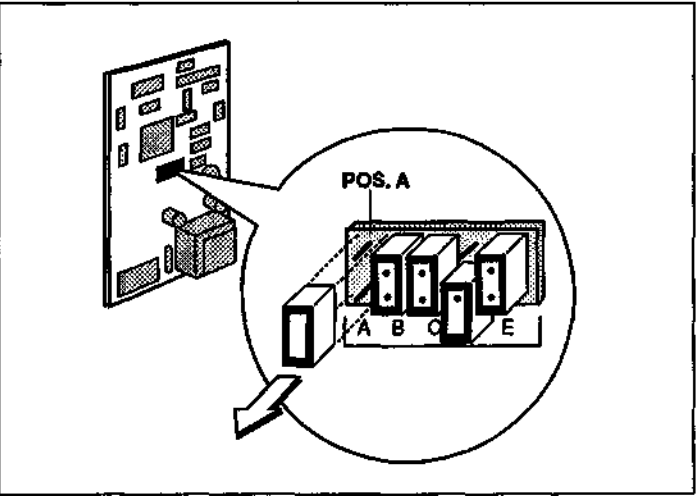
- 3. Follow steps 2 - 6 on pages 40 and 41 to reassemble the system.

■ **CHANGING THE FREQUENCY SETTING FOR AUTOMATIC RECIRCULATION**

To maintain water quality, the Milli-Q Plus system will automatically recirculate water for 5 minutes every 55 minutes when the system is in the STANDBY mode. If you wish, you can change the setting so that water will recirculate for 5 minutes every 3 hours.

To change the setting:

- 1. Follow steps 1 - 3 on pages 39 and 40 to access the PC board.
- 2. Remove Jumper A; connect it to one of the contacts (so that it remains steady on the PC board), but make sure that it does not bridge the contacts. If Jumper A is connected across the contacts on the PC board, water will recirculate for 5 minutes every 55 minutes; if it does not bridge the contacts, water will recirculate for 5 minutes every 3 hours.



- 3. Follow steps 2 - 6 on pages 40 and 41 to reassemble the system.

Troubleshooting The PC Board

Problem	Cause	Solution
Power lamp is off, system fuse O.K.	PC board fuse blown	replace PC board fuse; call Millipore Technical Service or see page 42
Auto Test reads TEST INCORRECT	temperature or resistivity miscalibrated	recalibrate temperature or resistivity; call Millipore Technical Service or see pages 43-45
Display shows TEMPERATURE < 0 °C TEMPERATURE > + °C and feed water temperature OK	thermistor damaged	call Millipore Technical Service, see pages 33 and 34

APPENDIX 2: Remote Control of the Milli-Q Plus System

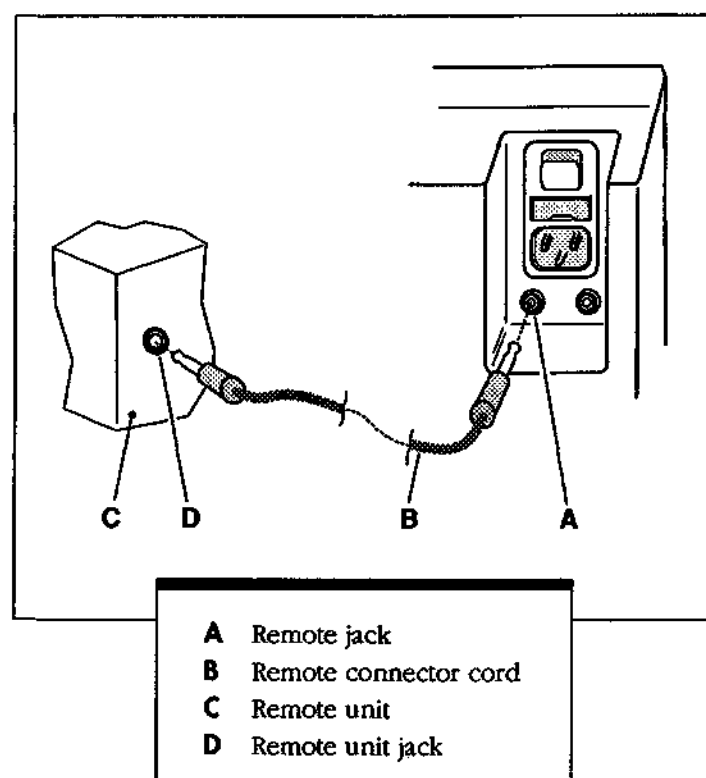
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The REMOTE STANDBY option enables you to control the operation of the Milli-Q Plus system from a remote location (such as a clinical analyzer). To connect the Milli-Q Plus system to a remote unit, you will need a remote connector cord, see pages 35 and 36 for ordering information.

To connect the Milli-Q Plus system to a remote unit:

1. Make sure the system is in the STANDBY mode.
2. Plug the remote connector into the remote jack on the Milli-Q Plus system. The display will show **STANDBY**.
3. Insert and connect the other end of the remote connector cord into the port on the remote unit.
4. Press OPERATE/STANDBY to put the system into the OPERATE mode and turn the RECIRCULATION/PRODUCTION valve to PRODUCTION.

Note: The settings on the Milli-Q Plus system take precedence over those on the remote unit; if the system is set on STANDBY, the pump will not start. When the pump starts, the system will run through the usual Auto Test sequence.



5. Use the remote unit. The Milli-Q Plus system will automatically supply water when it is needed by the remote unit.

Note: The Milli-Q Plus system will automatically switch from OPERATE to STANDBY when the remote unit does not need water; the display will read **REMOTE STANDBY**. When water recirculates (for 5 minutes every 55 minutes), the display will show **RECIRCULATION**.

CAUTION: Manually turn the RECIRCULATION/PRODUCTION valve to RECIRCULATION if you are leaving the system in REMOTE STANDBY for more than 55 minutes (that is if the system will go into its recirculation cycle).

6. When you are finished using the system from the remote, simply disconnect the remote connector cord from the remote port on the Milli-Q Plus system and the port on the remote unit.

CAUTION: Make sure the remote unit is not in use before disconnecting the remote connector cord.

When the remote connector cord is disconnected, the Milli-Q Plus system will automatically run through the Auto Test sequence. The display will show **TEST: 15 M Ω cm** (± 1 megohm-cm) for 4 seconds. The display will then show actual resistivity (**PRODUCT: ____ M Ω cm**).